

Research Article

Association of dental infections with systemic diseases in Brazilian Native Indigenous: a cross-sectional study



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Abstract

The aim of this cross-sectional study was to evaluate the association between dental infections and systemic diseases in the Indigenous population of Brazil. A representative sample of 225 Indigenous (≥ 19 years) was assessed. The T-test and bivariate and logistic models were used to assess the associations of diabetes, hypertension, and obesity with dental caries and destructive periodontal disease. After adjustments for covariates, dental caries were associated with hypertension (odds ratio = 1.95; 95% confidence interval: 1.03–3.66; $P = .04$). Individuals with destructive periodontal disease had a higher systolic blood pressure (124 ± 20.34 mm Hg) than those without destructive periodontal disease (117.52 ± 16.54 mm Hg; $P = .01$). In conclusion, dental infections were found to be associated with hypertension in the present population. Thus, patients diagnosed with hypertension should be referred for dental evaluation and vice versa. *J Am Soc Hypertens* 2016;10(5):413–419. © 2016 American Society of Hypertension. All rights reserved.

Keywords: Dental caries; hypertension; obesity; periodontal disease.

Introduction

Chronic noncommunicable diseases (NCDs) are a global health problem and a threat to human health and development. NCDs kill 38 million people each year, and cardiovascular diseases (CVDs) account for most NCD-related deaths, which total 17.5 million people annually, followed by cancers (8.2 million), respiratory diseases (4 million), and diabetes (1.5 million).¹ In 2011, 10 of the 15 leading

causes of death in the United States were chronic conditions, including heart diseases and diabetes.² In Brazil, 72% of all deaths were attributable to NCDs in 2007, and 32% and 6% of NCDs were attributed to CVDs and diabetes, respectively. Morbidity and mortality due to NCDs are the greatest in the poor population worldwide.¹

Dental infections are one of the most important sources of gram-negative bacteria in the human body, affecting quality of life and health.³ In many populations, tooth loss and severe periodontal disease have been widely linked to some NCDs as potential risk factors and vice versa, particularly to CVD and diabetes.^{3–7} Periodontal diseases have been associated with diabetes (odds ratio [OR] = 2.8; 95% confidence interval [CI]: 1.91–4.13),⁶ obesity (OR = 2.9; 95% CI: 1.3–6.1),⁷ and CVD (hazard ratio = 1.15; 95% CI: 1.03–1.28).⁴ History of caries has been linked to poor metabolic balance of diabetes (OR = 4.65; 95% CI: 1.28–16.89)⁸ and with many cardiovascular risk factors (OR = 1.50; 95% CI: 1.04–2.18).⁹ In

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Indian populations, the association between dental infections and systemic diseases is poorly known. One previous study evaluated tooth loss in 12,349 American Indian and Alaskan Native individuals aged 18 years and older and observed that tooth loss was more severe in the diabetic Indigenous.¹⁰ Many NCDs and dental diseases share the same risk factors, which explain some of the reports demonstrating the existence of an important inflammatory link between them. Bacteremia, bacterial endotoxins, cytokines, and other inflammatory mediators may be acting in a bidirectional manner in these diseases.¹¹

Although the prevalence and extents periodontal diseases and caries have decreased significantly in many populations over recent decades, they are still highly prevalent worldwide. The periodontitis and dental caries prevalence varies worldwide, being around 46% and 92%, respectively, in the United States.^{12,13}

The aim of the present cross-sectional study was to evaluate the associations between dental and systemic conditions in the Kiriri Indigenous. This community of 2182 Indigenous lives in an isolated area in the northeast region of Brazil. They have been subjected to external influences, but they still maintain their social, cultural, and behavioral traditions. Health care traditions involving the use of plant-based medicines and prayer, the lack of assistance with the transporting of patients from their remote geographical location, the poor quality of the public health care service, and the high costs of private health care inhibit the access of these individuals to dental and medical services.¹⁴ The Kiriri diet is based on beans, manioc, and corn. Consumption of sugar added to coffee and high-sugar foods is frequent. Sweet potato, pumpkin, okra, tomato, lettuce, and tropical fruits are part of the diets of many Indigenous. Meat, milk, and their derivatives are not available every day for all families.¹⁴ Previous studies of this population have shown that the prevalence of destructive periodontal disease is 97.8%.¹⁴

Methods

The present study was conducted in accordance with the World Medical Association Declaration of Helsinki. It was approved by the Brazilian Research Ethics Committee of the Ministry of Health, Brasilia, Brazil (Process# 25,000.066822/2011-45) and by Indian authorities and the Brazilian National Health Foundation (FUNASA). Subjects who agreed to participate signed an informed consent form. At the conclusion of the study, the Indian authorities and FUNASA were provided with a written report of the study results.

Study Population, Design, and Sampling Procedures

The present study is part of a larger project, and some of the results related to periodontal diseases have been previously published.¹⁴

This study was a cross-sectional survey. The target population was Kiriri Indigenous aged 19 years and older who were living in an isolated area in Bahia state in northeast Brazil.

The study sample was drawn from a representative sample of subjects aged 19 years and older from the Kiriri Indian population enrolled in a study of periodontal health.¹⁴ A representative sample size of adults was calculated for the periodontal health study based on information provided by FUNASA. Of 2182 Kiriri Indigenous living in the isolated Kiriri Indian area in 2011, 1025 were adults (≥ 19 years old). In brief, a sampling error of 5%, confidence level of 95%, and maximum percentage of periodontal disease of 79% were considered for the calculation of the sample size, which was determined to be 205 individuals. Considering a response rate of 90%, 226 individuals were randomly selected and invited to participate. The actual response rate was 99.6%, and 225 individuals ranging from 19 to 77 years old were examined (Table 1).

Table 1

General characteristics of the sample (Kiriri Indigenous, Brazil, 2011; N = 225)

Variables	N Total Sample (%)
Age (y)	
19–34	137 (60.9)
≥ 35	88 (39.1)
Education	
≥ 9 years	156 (30.0)
< 9 years	67 (70.0)
Income	
\geq US \$259.00	36 (16.1)
$<$ US \$259.00	187 (83.9)
Nicotine dependence	
No	199 (91.3)
Yes	19 (8.7)
Diabetes	
No	208 (93.7)
Yes	14 (6.3)
Hypertension	
No	171 (76.0)
Yes	54 (24.0)
Obesity	
No	191 (86.4)
Yes	30 (13.6)
Dental caries	
≤ 3	129 (57.3)
> 3	96 (42.7)
Destructive periodontal disease	
No	135 (60.0)
Yes	90 (40.0)
Plaque index	
$< 40\%$	140 (62.2)
$\geq 40\%$	85 (37.8)

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