Original Article

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Periodontal status of an indigenous population at the Xingu Reserve

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Abstract

Aim: To describe the prevalence of periodontal disease in the indigenous population of the Middle and Lower Xingu compared to the non-indigenous Brazilian population. **Methods:** The evaluated indigenous population of the Xingu Reserve had oral and dental examinations performed by calibrated examiners assisted by Oral Health Indigenous Agents. From a sample of 2,299 indigenous subjects, epidemiological investigations were conducted in 1,911 individuals, using the methodology recommended by the World Health Organization. Comparative periodontal data from the non-indigenous population were obtained from the Brazilian Ministry of Health's national epidemiological survey on oral health conditions ("*SB Brasil" project)*. The periodontal data of 508 indigenous individuals were presented by age intervals of 15-19 (n=219), 35-44 (n=128) and 65-74 (n=161) years. **Results:** In the non-indigenous population, the periodontally healthy individuals were 46.2%, 21.9% and 7.9% for each age group, respectively, and in the Xingu population they were 28.76%, 3.12% and 0% for each age group, respectively. The most frequent finding in the Xingu population was the presence of calculus in 62.55% of younger people, 82.03% of adults and 45.45% of the elderly. The analysis by sextants demonstrated the presence of calculus in 25.04%, 44.79% and 18.18% for young, adults and elderly respectively. **Conclusions:** Despite the higher prevalence of calculus, in all age groups of the indigenous population, tooth loss does not seem to follow the same pattern observed in the non-indigenous Brazilian population, suggesting differences in susceptibility, habits or conditions.

Keywords: epidemiology, periodontal disease, risk factor, indigenous health.

Introduction

Indigenous populations usually have primitive living conditions and limited health care due to their unprotected interaction with the predatory economic exploration. It has marked negatively the history of colonization of Brazil and is an example of social exclusion of large portion of the Brazilian population.

The epidemiology has provided the basis for the study of the healthy and diseased populations and the main causal factors involved. Furthermore, it has provided the basis for identifying the population segments with higher risks and evaluating the effectiveness of the services, programs and public health policies.

Arantes analyzing the oral health of indigenous populations affirmed that indigenous population studies are rare in Brazil, and only transversal surveys with

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small samples are found. This means that there are not sufficient quantitative and qualitative information about the indigenous oral health in Brazil[1].

Recently, interdisciplinary studies, especially in Public Health, have been developed aiming at the social determination of disease. In oral health, there are epidemiological studies about caries and periodontal disease in different indigenous groups[2].

In 2000, the Brazilian Ministry of Health initiated the discussion on the implementation of a project for the most comprehensive national epidemiological survey on oral health conditions to assess the main problems in different age groups including both urban and rural populations. This project, called as "*SB Brasil" project - Oral Health Conditions in the Brazilian Population,* began in 1999 with the creation of the Subcommittee responsible for developing and implementing the project[3]. Among all types of diseases of oral diseases, periodontal disease stands out, especially when there is involvement with a concomitant systemic condition.

Even having a different time scale and other human, social, economic and environmental factors, current indigenous groups, once in contact with domestic companies, also experience socioeconomic and ecological changes with strong potential to change their oral health conditions[4].

In order to integrate the National Oral Health Policy and National Policy for Indians Health Care, as well as to develop actions of oral health for the interest of the indigenous communities, the Ribeirão Preto Dental School of the University of São Paulo established a partnership approach with the Federal University of São Paulo (UNIFESP) and the Ministry of Health (FUNASA)[5]. This model of oral health care aimed at reducing the prevalence of oral diseases in the Middle and Lower Xingu. As an initial stage of the process, we have oral health diagnosis that enables the development of strategies for implementation and evaluation of oral health actions, since groups may have different prevalence of periodontal disease and may be influenced by conditions, susceptibility or habits.

The aim of this study was to evaluate the prevalence of periodontal disease in the indigenous population of the Middle and Lower Xingu compared to the clinical periodontal findings in the Brazilian population[3].

Material and methods

Created by a federal government act in 1961, the Xingu Indigenous Park is located in the north of the state of Mato Grosso, Brazil, with a length of 2.8 million hectares and a perimeter of 920 km. Located in an area of ecological transition, formed by tropical forests and savannah from north to south, the region presents great complexity in ecological, social and cultural questions. It is inhabited by 14 ethnic groups - Kuikuro, Kalapalo, Matipu, Nahukuá, Mehinaku, Wavre, Aweti, Kamaiurá, Trumai, Yawalapiti, Suiá, Kaiabi, Ikpeng and Yudjá - who speak different languages and are distributed in 49 villages and posts, with a total population of around 4,700 individuals[6].

A cross-sectional study was done with the entire indigenous population of the Xingu Indigenous Park – covering an area of Middle and Lower Xingu, of both sexes. From a sample of 2,299 subjects, epidemiological investigations were conducted in 1,911 individuals because of lack of authorization or failure of showing at the place of examination in time. The clinical examinations were performed in 35 villages by 5 calibrated examiners and assisted by Oral Health Indigenous Agents (AISB), with natural light, using oral mirror and World Health Organization (WHO) probe (Hu-friedy, Chicago, USA), using the methodology recommended by the WHO. Data were processed in an electronic formed in the software SB Data[3].

Community Periodontal Index (CPI) was used considering the highest CPI score per individual, according to the age group. The periodontal data of 508 indigenous individuals were presented by age intervals of 15-19 (n = 219), 35-44 (n = 128) and 65-74 (n = 161) years, as recommended by WHO[7].

Comparative periodontal data from the non-indigenous population were obtained from the epidemiological data collected from the "*SB Brasil" project*.

The results of the calibration were measured by percentage of agreement and Kappa coefficient for the periodontal condition in the age groups reached 0.82% of reliability[8].

In accordance with the guidelines of the Brazilian National Health Council 196 Resolution (1996)[9], the research project was approved by the Research Ethics Committee of the Ribeirão Preto Dental School of the University of São Paulo and by the Brazilian Research Ethics Commission (Process 2008.1.166.587).

The enrollment of the study subjects was authorized by the members of the Indian Council of Xingu. After receiving explanations about the study design and warrants about their privacy and confidentiality of their information, all participants or their legal representatives signed an informed consent form.

Clinical data were grouped and stratified by age groups. Comparisons among the groups and sextants were performed using ANOVA and Student's t-test with significance level set at 5%.

Results

All clinical periodontal data recorded from the Middle and Low Xingu population are presented in the Table 1 (individual means) and Table 2 (sextants). In general, the non-indigenous population had better periodontal health than the Middle and Lower Xingu population, as demonstrated by the clinical indicators *gingivitis and calculus*. In the SBBrasil project[3], the percentage of periodontally healthy individuals the 15-19, 35-44 and 65-74-year-old age groups was, respectively, 46.2%, 21.9% and 7.9%, for the non-indigenous population, and 28.76%, 3.12% and 0.00%, respectively, for the Middle and Lower Xingu population (Table 1). The most frequent finding in the Xingu was the presence of calculus with 62.55% of young people, 82.03% of adults and 45.45% of the elderly ($p < 0.05$). The analysis by sextants demonstrated the presence of calculus in 25.04%, 44.79% and 18.18% for young, adults and elderly

Table 1- Number and percentage of people, according to the highest degree of periodontal condition observed in the individual, age and population of study. Brazil (2004)[4] and Middle and Lower Xingu, 2006.

Population		Periodontal Condition (CPI)													
		Healthy		Bleeding		Calculus		Periodontal pocket of 4 - 5 mm		Periodontal pocket of 6 e +mm		Excluded		Without information	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
15 a 19 years	Xingu	63	28.76	18	8.21	137	62.55	0	0	0	0	1	0.45	0	0
	Brazil	7772	46.18	3160	18.77	5622	33.4	0	0	0	0	53	0.31	0	0
35 a 44 years	Xingu	4	3.12	4	3.12	105	82.03	9	7.03	0	0	6	4.68	0	0
	Brazil	2947	21.94	1339	9.97	6279	46.76	1056	7.86	0	0	1525	11.35	0	0
65 a 74 years	Xingu	0	0	0	0	15	45.45	3	9.09	0	0	11	33.33	4	12.12
	Brazil	422	7.89	175	3.27	1.163	21.74	238	4.48	99	1,85	3252	60.8	0	0

Table 2 - Average number of sextants and the respective shares for each CPI scores according to age and population. Brazil (2004)[4] and Middle and Low Xingu, 2006.

Population		Periodontal Condition (CPI)													
		Healthy * P<0.001		Bleeding P=0.06		Calculus * P<0.001		Periodontal pocket of 4-5 mm		Periodontal pocket of 6 e + mm		Excluded		Not examined	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
15 a 19 years	Xingu	4.03[a]	67.12	0.44	7.38	1.50[a]	25.04	0	0	0	0	0	0	0.03	0.46
	Brazil	4.15	69.17	0.87	14.5	0.88	14.67	0.02	0.33	0	0	0.08	1.33	0	0
35 a 44 years	Xingu	1.12[b]	18.62	0.32	5.34	2.69[b]	44.79	0.11	1.82	0	0	1.58	26.30	0	0
	Brazil	1.87	31.11	0.53	8.82	1.31	21.8	0.15	2.5	0.04	0.67	2.11	35.1	0	0
65 a 74 years	Xingu	0.09[c]	1.52	0.06	1.01	1.09[a]	18.18	0.09	1.52	0	0	3.67	61.11	1.00	16.67
	Brazil	0.42	7	0.12	2	0.50	8.33	0.88	1.33	0.03	0.50	4.85	80.84	0	0

*ANOVA p<0.05; different letters indicate statistically significant difference

respectively (Table 2). The prevalence of 4-5-mm-deep periodontal pockets, which indicates poor periodontal condition, was higher among the elderly, with 4.48% in the non-indigenous population and 9.09% in Xingu population.

Discussion

Brazilian indigenous populations are experiencing a process of epidemiological transition marked by the coexistence of high rates of infectious and parasitic diseases, which remain as major causes of death, and the emergence

of chronic diseases later. The emergency of this group of diseases, which affect their morbidity and mortality profile, is directly related to a sociocultural and economic change that this population has been facing.

It is relevant to highlight that there is a large number of excluded sextants, when one considers the percentage of poor scores or the mean of sextants affected in the 35-44 and 65-74-year-old groups. On that last track, for example, over 80% of sextants examined were excluded in the non-indigenous population. In the Xingu population over 60% of sextants examined were excluded, or did not have any tooth present or only one functional tooth. This fact reflects a low prevalence of severe periodontal disease in these age groups.

As for any index that imposes categorical scales, in a biological process, there are limitations to be identified and recognized. Many of the restrictions are outside the proposals for what was designed or by recent advances in understanding the process of periodontal disease. In this context, considering the need to overcome the limitations listed above and based on the comparability of data on national and international level, it is suggested the use of the CPI index, which is current recommended by the WHO to address the needs for treatment[10].

In relation to periodontal disease, it is interesting to note that despite the absence of a systematic and widespread oral hygiene routine among Xavante Indians in Pimentel Barbosa village, the CPITN index suggests low occurrence of periodontal disease in advanced stages[4]. It was also observed by Niswander (1967) in Xavantes of the Simões Lopes village[10].

In Pimentel Barbosa village, gingivitis was more common among women, while calculus was more common among mean. However, the small sample sizes do not permit definitive conclusions about the differences between genders for these parameters. It is little expressive the occurrence of periodontal pockets and teeth with mobility in both sexes, even among the elderly. This profile may reflect the greater resistance of local irritating factors (plaque, calculus) and these results come from areas not investigated in this study, such as oral flora or possible beneficial effects of stimulating the tissue of support, promoted in part by diet, which consists of hard and fibrous foods[4]. The distribution of gingivitis in any population is important since current theory holds that the gingival lesion is the precursor of periodontitis[11].

Historically, the Brazilian indigenous societies have undergone accelerated process of sociocultural and economic changes, once in contact with the national society. These changes impact directly on the dietary habits and nutritional status of these groups, especially during the initial process of integration into the regional economic market. As a result, basic activities of subsistence tend to be partially or completely abandoned, leading to a reduction in variability and to increase the dependence on manufactured food and products[12]. Furthermore, the literature have shown evidence that macronutrients and micronutrients may modulate pro-inflammatory and anti-inflammatory host responses, which, in turn, contribute to the individual baseline inflammatory status[13] and also predispose to other systemic conditions[14].

Modern concepts of periodontal disease etiology, pathogenesis and natural history clearly classify the disease into different types within individuals of varying risk, who all possess sites that are at variable risk from destructive disease[15].

Since the creation of the Xingu's Indigenous Park in the early 1960s up to the mid-1980s, its inhabitants lived in a state of isolation from the outside world and counted on a strong and protective presence of the Brazilian State. However, the presence and assistance from the Brazilian state decreased significantly after that and the Indians of the Xingu's Indigenous Park started taking account of the vulnerability of their territorial limits and sustainability of its natural resources. They have witnessed the spread of the fires originated in farms that had been illegally installed in their lands, the intermittent intrusion of hunters and fishermen, the silting of the rivers due to increasing deforestation, the risk of water contamination by the defensive use of chemical activities agricultural and intense illegal exploitation of timber resources. As a consequence of these events, it has been observed in recent years a change in the behavior of young people with regard to the rituals of incarceration and their sexuality. A major risk factor that has been presented in a more significant way is the increased mobility of the Indians, and the exits to the city are much more frequent, which has collaborated to the change in dietary habits. The introduction of nursing bottle and powdered milk has generated changes in the pattern of morbidity. The first case of diabetes mellitus was diagnosed, and other cases of hypertension have emerged. Children who have been bottle fed have presented problems more frequent such us diarrhea and/or malnutrition[16].

The model of health care that has been consolidating is a product of a long journey, in which the UNIFESP has collaborated since the beginning. It seeks to provide answers to key problems arising from social and historical process of contact between Indians and settlers, prioritizing inter-setcorial actions and the growing involvement of Xingu's population. It is guided to the construction of a new intercultural dialogue that enhances the citizenship in contrast to relations historically marked by paternalism and dependency. It is characterized by an integral assistance to the individual and the communities, and the adoption of standardized clinical protocols, health programs and team support by local actions have been its main instruments. There is no conflict between the causal and clinical approaches of biomedicine and traditional medicine. The actions of prevention and intervention on the health-disease dyad are organized according to the complexity of each case and the local reality. Prevailing systems of different etiology, prevention and cure of diseases, there is a major concern of both the Indians as the team health to maintain intercultural dialogue as a way to better understand the health needs of the Xingu's Indians[17].

Despite the higher prevalence of calculus, in all age groups of the indigenous population, tooth loss does not seem to follow the same pattern observed in the non-indigenous Brazilian population, suggesting differences in susceptibility, habits or conditions.

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