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# Factors Associated with the Presence of Teeth in the Adult and Elderly Xukuru Indigenous Population in Ororubá, 2010

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Additional information is available at the end of the chapter

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## 1. Introduction

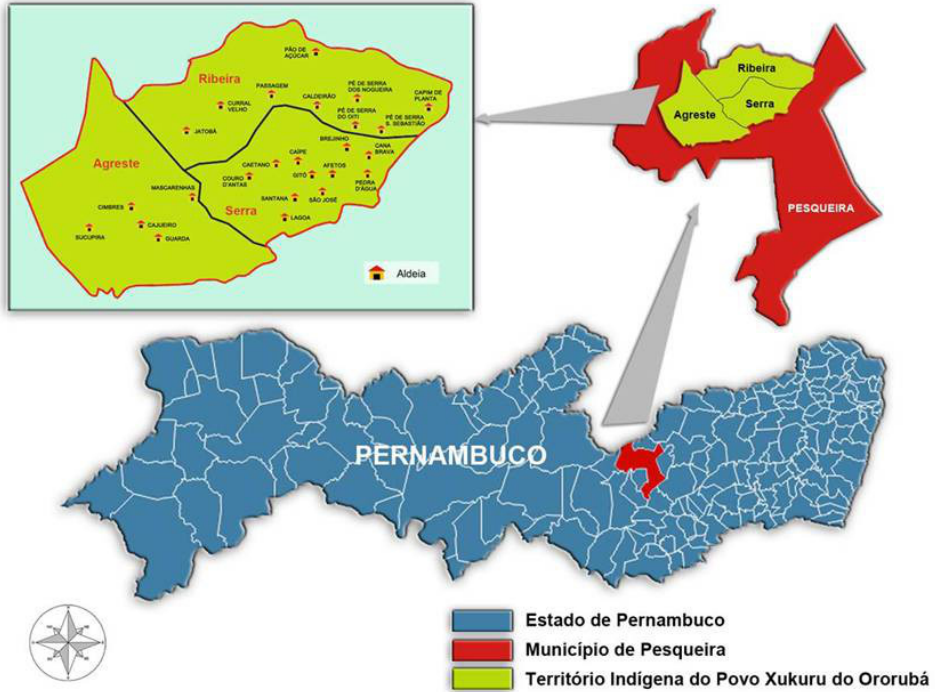
Indigenous peoples in Brazil have particular configurations of customs, beliefs and language, forms of integration with the environment, history of interaction with the settlers and relationship with the Brazilian state. Thus insert the different ways in national society [1].

In Brazil, as in many other parts of the world, indigenous peoples are constitute as one of the most disadvantaged segments of the economic, housing, educational standpoint and health indicators, as revealed by the census and other surveys that measure conditions life of the population. In addition, for cultural or relationship with the environment reasons, require specific public policies [1].

The indigenous people Xukuru has the largest indigenous ethnic population group among the 10 ethnic groups of Pernambuco. Located in Pesqueira in the Sierra Ororubá, 216km from Recife (principal city of Pernambuco State) and has a population of approximately 10.000 indigenous [2].

The Xukuru suffered from the loss of traditional lands to allow their social and cultural reproduction and were the target of every source of discrimination, especially from the eighteenth century [3]. After the retaking of their lands the indigenous territory Xukuru now has 25 villages that are distributed in three environmentally bounded regions: the Ribeira, the Serra and the Agreste (Figure 1). The approval of the land in this population resulted in changes in the social context [4] that seems to have contributed in some way to changes in the mode of life of this population. These changes are called acculturation, which is perceived as a result

of an exchange process in which two cultures mutually absorb their characteristics and customs generating a new reference.



**Figure 1.** Geographical location of the Indian Territory Xukuru Ororubá and its division according to the socio-environmental regions and villages. Pesqueira, 2010 [5].

The health of indigenous peoples of Brazil presents complex and dynamic way. Is directly related to historical processes of social, economic and environmental changes, linked to the expansion and consolidation of demographic and economic fronts of society in various regions of the country [6].

The epidemiological profile of indigenous peoples is little known, which stems from the insufficiency of investigations, surveys and censuses, as well as the inaccessibility of information on morbidity and mortality systems. Any discussion of the health-disease process of indigenous peoples need to take into consideration, in addition to epidemiological and demographic dynamics, the enormous existing social diversity [7-11].

For proper understanding of the health-disease process on indigenous peoples it is necessary to appeal to the historical relations in which human societies are inserted [10]. Despite the fragmentation and lack of historical data on the history of contact between indigenous people

and other population groups in Brazil records, it is known that the effects of this interaction on the profiles of illness and death were significant [12].

The epidemiology of oral health among indigenous peoples in Brazil is little known, which reflects a more general framework of ignorance about the health of these populations [7]. This perspective, intense socioeconomic and environmental changes that have been going these people, including subsistence and diet, are enablers of change in oral health status known aspects [10]. Main responsible for the deterioration in oral health are the changes in the traditional diet (especially intake of sugar and other processed products) and the economic system of this group, together with the lack of a preventive program [13].

From the 1960s, there was an increased incidence of caries, with the determining factor in changing dietary patterns and increased availability of fermentable carbohydrates in the diet. Although caries is a disease that has known and proven effective methods of prevention and control, precarious epidemiological profile found in indigenous populations illustrates the social exclusion of the latter from access to dental care groups and methods of oral health promotion [14].

Caries is the main cause of tooth loss. To a lesser degree are periodontal disease and dental injuries [15]. Tooth loss related to tooth extractions caused by preventable diseases, including, dental caries and periodontal diseases is very high and remains prevalent worldwide despite progress in prevention and early treatment of these diseases [16]. In addition to these diseases, tooth loss is due to attitudes of dental professionals and the public, accessibility and utilization of dental services, the type of financing of the health system and the way to provide dental care. Another primary cause or related of tooth extractions are the economic reasons [17-20].

Social conditions and dental practices hegemonic force the socioeconomically disadvantaged individuals to treat dental pain with extractions. Epidemiological data have shown significant increase of loss with age. In Brazil, the extraction mass begins at age 30 and is the most practical and economical solution for the accumulated oral health problems [16, 21].

The loss of teeth is the most common cause of impaired chewing, being related to the reduction of masticatory ability and perceptions of chewing ability. When associated with difficult access to prostheses result in functional and psychosocial disorders such as poor chewing, speech related problems, employment difficulties, dissatisfaction with appearance, among others. Little attention has been given to the impact that can cause tooth loss in chewing ability and changes in food thereon, which are determinants of nutritional status of these individuals as well as reduced self-esteem and social integration [21-25].

The variables related to tooth loss ranging from dental work (the increase in periodontal attachment loss, number of coronal and root surface caries, tooth mobility and fracture in restoration) to the individual level (the reporting dental pain, the need perceived dental treatment, frustration with dental care, preference for extraction instead of conservative treatment, older age group, black race and female) [26]. Early tooth loss should be considered a predictor of future tooth loss. There are significant correlations between early tooth loss and social variables, such as the human development index, ethnicity, education, income under

the minimum wage, lack of fluoridated tap water and people living in cities with fewer than 10,000 inhabitants, which already were reported in other studies [27].

In Australia less than 2% of adults aged 35-54 years have complete tooth loss, but this increases to 36% for people aged 75 years or more [28]. The age distribution of edentulism for indigenous peoples is noticeably different from that of the total population. The level of edentulism is almost five times higher among people aged 35-54 years indigenous than among non-indigenous counterparts (7.6% compared with 1.6%). There is also a noticeable difference for those aged 55-74 years, 21% of indigenous peoples suffer from edentulism compared with 14% of non-Indians [29].

In general, lacking qualitative and quantitative information on the oral health status of indigenous peoples in Brazil, especially longitudinal studies to support an evolution of oral epidemiology. Particularly, in the northeast state of Pernambuco and the paucity of studies on the oral health status of indigenous peoples has become even more alarming which reflects the lack of information on the reality of these peoples and the consequent social exclusion which are submitted. This study aims to contribute to a better understanding of tooth loss in adults and elderly of this indigenous population, studying the factors associated with permanent teeth factors.

## 2. Methods

### 2.1. Location and study population

This study consists of a deepening of two studies entitled "Analysis of Living, Health and Vulnerability of Indigenous People Xukuru Ororubá as the tool for the Shares of Primary Health Care" [30] and "Health and Living Conditions of the Indigenous People Xukuru Ororubá of Pesqueira - PE "[31] that were developed in Pesqueira, Northeast Region of Brazil. The field work was developed with the participation of indigenous population only in the period January to March 2010.

### 2.2. Sampling plan

Due to the larger study have sought to analyze various health situations, the sample size was based on the condition of lower prevalence being studied which was equivalent to a third of the universe. This sampling strategy ensured the representativeness of the smaller study group, with the lowest prevalence being estimated. Consequently allowed the representation of the other study groups. It was found that the population of the ethnic group Xukuru is formed by 7,225 people, 1,896 households dwelling and socio-environmental distributed in 3 regions and 25 villages. From these census data, the sample consisted of 632 households (equivalent to a third of the universe).

The selection of households for the sample is given in a systematic random manner, ensuring all members of the population the same chance of being chosen. To systematize the sample, the following calculation was used:  $k = N$  (population) /  $n$  (sample). Then, the initial sampling

unit was selected by lottery between 1 and k, ie, between the numbers one, two and three. With number three drawn, broke for the selection of households starting at home in 1001, ie, the first home of the village of number one. From there followed the systematization where every three households, the third was selected. This sampling was continued until the last possible home the last village. At the end, 632 households were randomly selected and all the inhabitants of these households who are aged 35-44 years and 60 years and older were included in the sample.

Those who were excluded during the visit had some temporary impossibility (as being hospitalized or sick) or a disability that prevented the completion of the oral clinical examination.

### **2.3. Instrument for data collection**

The instruments for data collection were based on records proposed for the Project SB Brasil 2003 [32] and SB Brasil 2010[33]. The codes and criteria adopted are those proposed by the World Health Organization (WHO) publication *Oral health surveys: basic methods*, fourth edition [34].

Data collection was made up of eight teams formed by a dentist (examiner) and an annotator. Standardization was done as the criteria and approaches used to test intra-examiner and inter-examiner before and during the process of data collection. And were reexamined 5% of the sample that aimed to estimate the agreement of the main study findings.

The local and the organization of the examination areas were defined according to the availability of the site, with natural lighting, ventilation and proximity to a water source needed. The examiner, the annotator and the examined person sat for the exam. The tests were conducted using a combination of a dental mirror with handle, and a specific probe, developed by WHO, known as "CPI probe."

### **2.4. Description of variables**

The dependent variable is being studied to tooth loss that represents the count of missing teeth (varying 0-32 teeth), is due to decay or other reasons.

The independent variables were collected through the questionnaire administered by a health survey and also by the census Xukuru be classified into three categories: Characterization of sociodemographic and socioeconomic profile (place of residence, income, age, sex, attends school, can read and write), Characterization of access to oral health care (dental visits, time of last dental appointment, place of last dental visit, reason for last dental visit) and characterization of self-perception and impact on oral health (dental appointment last assessment services, satisfaction with teeth / mouth, OI DP).

### **2.5. Processing of data**

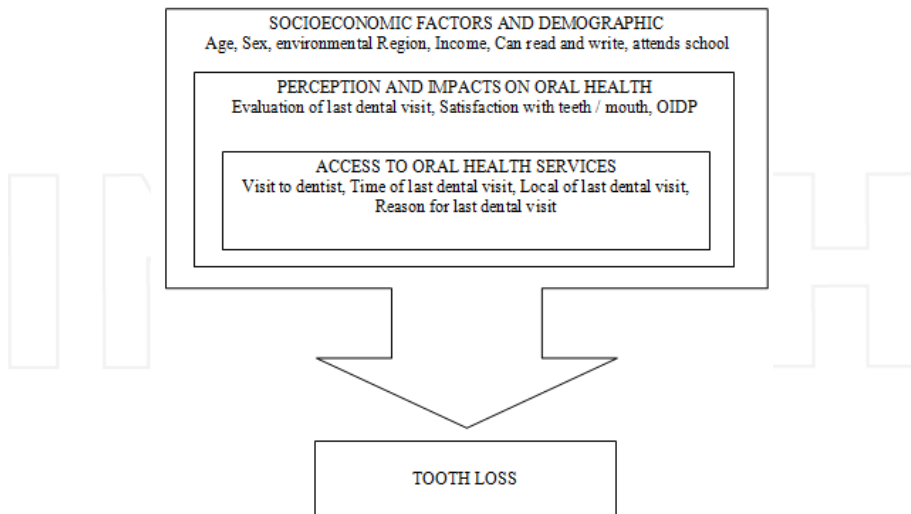
The data collected were criticized to correct fill failures and processed at the National School of Public Health - ENSP / FIOCRUZ, a partner institution of the Center Aggeu Magalhães - CPqAM / FIOCRUZ this health survey.

Before to the analysis, the database went through a cleansing process in which the entered data were compared with the information provided in the questionnaires. In case they found differences, the database was corrected.

## 2.6. Data analysis

The data were tabulated in EpiData (version 3.1). Data analysis was initially performed using the statistical package SPSS 13.0® with the distribution of frequencies and description of the measures of central tendency and dispersion. The analyzes were presented in tables.

Association analyzes/dependence were performed by means of parametric or non-parametric tests, depending on the type of distribution and the nature of the variables under study. Effect measures were calculated, emphasizing reason means (RM) and odds ratio (OR) simple and adjusted for confounding variables. For both, negative binomial regression models with inflated zero were adopted in order to check the direction and strength of the effect of independent variables on the outcome analyzed. This model is used when the variable is discrete with quantitative absence of normal distribution and when there is overdispersion of the data distribution [35]. Due to the large number of zeros present in the dependent variable (many adults and especially seniors had missing teeth, or teeth zero), it was recommended the use of this regression model. This model presents two regression coefficients, one for the non inflated zeros (whose measure of effect is the RM and is associated with increased number of teeth) and other coefficients for the part inflated zeros (whose measure is the OR and will be associated with the presence of teeth zero, ie the edentulous). The influence of the factors under study on tooth loss followed the hierarchical model proposed by Victora et al. [36] showed in the Figure 2.



**Figure 2.** Theoretical Hierarchical Model of variables associated with the presence of permanent teeth. Pesqueira, 2010.

## 2.7. Ethical aspects

This study was based on "Health and Living Conditions of the Indigenous People Xukuru Ororubá the Pesqueira-PE" which was approved by the Ethics in Research-CEP (CPqAM / Fiocruz) and the National Committee for Research Ethics - CONEP / National Board of Health / Ministry of Health, through Opinion nº 34/2011. The study "Analysis of Living, Health and Vulnerability of Indigenous People Xukuru Ororubá as the tool for the Shares of Primary Health Care" that contains the census Xukuru also obtained approval of the CEP by Opinion nº 604/2009.

The project also received permission from FUNASA for this work, as well as the letter of consent from the ethnic Xukuru Ororubá signed by Cacique Marcos de Araújo Luidson after approval of the Local Council of Indigenous Health Xukuru was obtained and the Consent and Informed (IC) of the political leaders of each village existing in Indian Territory.

## 3. Results

A sample of the Survey of Health Xukuru the Ororubá constituted 632 selected households. Among these, 27 households were considered lost due to the absence of its residents in the three visits by field staff. Thus, the final sample consisted of 605 households.

The average of the presence of permanent teeth tooth was 10.43 ( $\pm$  9.79). Table 1 shows the composition of the sample and the average of permanent teeth according to the independent variables. It was observed that 39.0% of individuals residing in the Agreste region of the Indigenous Territory and about 50.7% had an income between R\$ 216,00 - 465,00.

The socio-demographic structure of the population studied was 45.6% of adults and 54.4% of elderly, composed mostly of males (50.7%). Among adults with an average age of 39.2 years and among older average age was 70.3 years. It was observed that 58.2% can not read and write and 56.1% have attended school.

	Variable	N (%)	Average	$\pm$ DP	CI 95%	Median	p-value *
<b>Age group</b>	Adults	195 (45,6%)	17,91	7,90	16,80-19,03	19,00	<0,001
	Elderly	233 (54,4%)	4,16	6,15	3,37-4,96	1,00	<0,001
<b>Sex</b>	Male	217 (50,7%)	11,49	9,97	10,15-12,82	10,00	0,010
	Female	211 (49,3%)	9,34	9,50	8,05-10,63	7,00	0,010
<b>Enviromental region</b>	Ribeira	131 (30,6%)	9,90	9,30	8,29-11,52	9,00	0,531
	Serra	130 (30,4%)	10,24	10,13	8,48-12,0	7,50	0,531
	Agreste	167 (39,0%)	11,16	9,95	9,61-12,72	11,00	0,531

	Variable	N (%)	Average	±DP	CI 95%	Median	p-value *
<b>Income</b>	Tertile 1 (R\$ 0 - 215,00 reais)	140 (32,7%)	16,68	7,96	15,35-18,01	18,00	<0,001
	Tertile 2 (R\$ 216,00 - 465,00)	217 (50,7%)	6,58	8,52	5,44-7,73	3,00	<0,001
	Tertile 3 (R\$ 466,00 -1500,00)	62 (14,5%)	8,77	9,76	6,29-11,25	4,00	<0,001
	Missing	9 (2,1%)					
<b>Can read and write</b>	Yes	173 (40,4%)	13,47	9,89	11,98-14,95	13,00	<0,001
	No	249 (58,2%)	8,39	9,19	7,23-9,54	5,00	<0,001
	Missing	6 (1,4%)					
<b>Attends school</b>	Yes	25 (5,8%)	17,56	9,18	13,76-21,35	19,00	<0,001
	No, already attended	240 (56,1%)	11,76	9,74	10,52-13,0	11,00	<0,001
	No, never attended	154 (36,0%)	7,36	8,97	5,93-8,79	4,00	<0,001
	Missing	9 (2,1%)					
<b>Satisfaction with teeth/mouth</b>	Satisfied	235 (54,9%)	7,42	8,70	6,18-8,67	4,0	<0,001
	Neither satisfied nor dissatisfied	31 (7,2%)	12,28	8,35	9,04-15-52	11,50	<0,001
	Dissatisfied	158 (36,9%)	15,48	9,08	13,92-17,03	17,00	<0,001
	Missing	4 (0,9%)					
<b>Review of last visit</b>	Good	345 (80,6%)	10,58	9,66	9,51-11,65	9,00	0,424
	Regular	22 (5,1%)	12,94	8,82	8,69-17,19	14,00	0,424
	Bad	24 (5,6%)	10,81	9,60	6,55-15,07	9,00	0,424
	Missing	37 (8,6%)					
<b>OIDP</b>	No impact	155 (36,2%)	7,85	9,48	6,34-9,35	4,00	<0,001
	One or more impact	233 (54,4%)	13,07	9,40	11,85-14,28	13,00	<0,001
	Missing	40 (9,3%)					
<b>Visit to dentist</b>	Yes	397 (92,8%)	10,11	9,61	9,16-11,06	8,00	0,004
	No	28 (6,5%)	15,92	10,93	11,68-20,16	17,00	0,004
	Missing	3 (0,7%)					
<b>Time of last visit</b>	Less than 1 year	81 (18,9%)	15,37	8,40	13,51-17,22	17,00	<0,001
	1 to 2 years	84 (19,6%)	15,17	8,04	13,43-16,92	16,50	<0,001
	3 years and more	228 (53,3%)	6,62	8,90	5,44-7,79	2,00	<0,001
	Missing	35 (8,2%)					



Variable		N (%)	Average	±DP	CI 95%	Median	p-value *
Local of last visit	Public	241 (56,3%)	12,30	9,54	11,09-13,51	12,00	<0,001
	Particular, health plan, covenants	151 (35,3%)	7,02	8,79	5,58-8,45	3,00	<0,001
	Missing	36 (8,4%)					
Reason for last visit	Review, prevention, treatment and other	71 (16,6%)	13,91	10,42	11,44-16,38	16,00	<0,001
	Pain	47 (11,0%)	12,82	9,25	10,11-15,54	14,00	<0,001
	Extraction	278 (65,0%)	8,71	9,12	7,64-9,79	6,00	<0,001
	Missing	32 (7,5%)					
<b>Total</b>		<b>428 (100%)</b>	<b>10,43</b>	<b>9,79</b>		<b>9,0</b>	

\*P-value from Mann-Whitney e Kruskal Wallis test.

**Table 1.** Description of average indigenous Xukuru permanent teeth in adults and the elderly. Pesqueira, 2010.

Regarding the perception and impact on oral health, 235 individuals (54.9%) say they are satisfied with their teeth / mouth, 80.6% rated the last query as good and 54.4% reported one or more impacts on oral health in daily life. Regarding access to dental services, 28 individuals (6.5%) had never been to the dentist, 53.3% had a dental appointment last three years and over and 56.3% held in the public service. The main reason for consultation to 65.0% of the subjects was to perform extraction.

Table 2 shows the results of a single regression model. The average ratio (RM) presented considers the variance present in each level and shown as a measure of effect corrected to factors associated presence of teeth.

Individuals of adult age group showed less tooth loss and RM 2.29. But women showed greater chance of tooth loss (OR = 1.99). Regarding environmental region and income were not significant for tooth loss. Reading and writing (RM = 1.27) is negatively associated to tooth loss as well as those attending (RM = 1.55) or have attended school at some time in life (RM = 1.26).

With regard to the variables of block 2, who says satisfied with teeth / mouth has greater tooth loss (RM = 0.74) and those with a greater number of teeth present in the mouth has more impact on oral health (RM = 1.23). Regarding the last consultation, evaluation dictates how fair and poor is related to having more teeth.

Among the variables in block 3 is important to note that anyone who has ever been to the dentist in life has more chance of not having teeth, or going to the dentist increases by 160% tooth loss than those who have never been. For people who performed the last visit for more than three years average of teeth present was lower (RM = 0.68). Having performed consulting in public service decreased the chance of tooth loss (OR = 0.36) and who was motivated to consultation with the purpose of extracting has fewer teeth (RM = 0.67).

Demographic variables Block 1		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
<b>Age group</b>	Adults	2,29	2,02-2,59	<0,001	0,05	0,02-0,11	<0,001
	Elderly	1,00			1,00		
<b>Sex</b>	Male	1,00			1,00		
	Female	0,99	0,85-1,15	0,902	1,99	1,29-3,06	0,002
<b>Can read and write</b>	Yes	1,27	1,09-1,47	0,001	0,40	0,25-0,65	<0,001
	No	1,00			1,00		
<b>Attends school</b>	Yes	1,55	1,16-2,07	0,003	0,27	0,02-0,58	0,008
	No, already attended.	1,26	1,08-1,49	0,004	0,48	0,31-0,75	0,001
	No, never attended.	1,00			1,00		
Perception variables Block 2		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
<b>Satisfaction with teeth/mouth</b>	Satisfied	0,74	0,63-0,86	<0,001	5,73	3,25-10,09	<0,001
	Neither satisfied nor dissatisfied	0,84	0,64-1,11	0,24	2,28	0,84-6,17	0,103
	Dissatisfied	1,00			1,00		
<b>Review of last visit</b>	Good	1,00			1,00		
	Regular	1,02	0,75-1,39	0,878	0,48	0,15-1,49	0,207
	Bad	0,86	0,64-1,17	0,348	0,42	0,13-1,33	0,143
<b>OIDP</b>	No impact	1,00			1,00		
	One or more impact	1,23	1,05-1,44	0,009	0,33	0,21-0,54	<0,001
Access variables Block 3		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
<b>Visit to dentist</b>	Yes	0,77	0,59-1,01	0,066	2,60	0,86-7,84	0,088
	No	1,00			1,00		
<b>Time of last visit</b>	Less than 1 year	1,00			1,00		
	1 to 2 years	0,92	0,75-1,12	0,421	0,37	0,10-1,39	0,143
	3 years and more	0,68	0,56-0,82	<0,001	6,78	3,17-14,47	<0,001
<b>Local of last visit</b>	Public	1,29	1,09-1,53	0,002	0,36	0,23-0,57	<0,001
	Particular, health plan, covenants	1,00			1,00		

Demographic variables Block 1		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
Reason for last visit	Review, prevention, treatment and other	1,00			1,00		
	Pain	0,85	0,65-1,11	0,251	0,73	0,30-1,77	0,49
	Extraction	0,67	0,55-0,81	<0,001	1,29	0,72-2,32	0,38

RM: Ratio of average

OR: Odds Ratio

CI 95%: confidence interval of 95%

**Table 2.** Average Ratio (RM) and odds ratio (OR) of teeth present estimates of the simple model of zero-inflated negative binomial regression. Pesqueira, 2010.

Table 3 presents the results of multiple hierarchical model, according to the theoretical model presented in Figure 2. Was observed that among the variables in block 1 only age and sex were statistically significant. Being female is an increased likelihood of tooth loss (OR = 2.68). In block 2 only satisfaction variable in the final model and their effects were controlled for block 1.

In block 3 variables time of last visit and reason for last visit remained the final model. A higher probability of not having teeth was related to having made the last visit for more than 3 years (OR = 2.65).

Demographic variables Block 1		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
Age Group	Adults	2,29	2,02-2,59	<0,001	0,04	0,02-0,09	<0,001
	Elderly	1,00			1,00		
Sex	Male				1,00		
	Female				2,68	1,63-4,43	<0,001
Perception variables Block 2		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
Satisfaction with teeth/mouth	Satisfied	0,88	0,78-1,00	0,05	3,40	1,81-6,36	<0,001
	Neither satisfied nor dissatisfied	0,95	0,76-1,19	0,69	1,83	0,59-5,63	0,287
	Dissatisfied	1,00			1,00		
Access variables Block 3		Not inflated			Inflated		

Demographic variables Block 1		Not inflated			Inflated		
		RM	CI 95%	p-value	OR	CI 95%	p-value
		RM	CI 95%	p-value	OR	CI 95%	p-value
<b>Time of last visit</b>	Less than 1 year				1,00		
	1 to 2 years				0,33	0,08-1,33	0,118
	3 years and more				2,65	1,05-6,70	0,038
<b>Reason for last visit</b>	Review, prevention, treatment and other	1,00			1,00		
	Pain	0,92	0,75-1,12	0,424	0,19	0,05-0,70	0,012
	Extraction	0,79	0,68-0,92	0,003	0,36	0,15-0,85	0,020

\* Adjusted for variables in block 1.

\* Adjusted for variables in block 1 and 2.

\* Adjusted for variables in block 1, 2 and 3.

RM: Ratio of average

OR: Odds Ratio

CI 95%: confidence interval of 95%

**Table 3.** Average Ratio (RM) and Odds Ratio (OR) of teeth according to estimates from multiple hierarchical multilevel model of zero-inflated negative binomial regression. Pesqueira, 2010.

## 4. Discussion

The average number of permanent teeth found in this study was lower than that found by [37]. Adults in this study had an average of 17.91 permanent teeth ( $\pm 7.90$ ) and older had an average of 4.16 permanent teeth ( $\pm 6.15$ ). Early tooth loss is considered a predictor of future tooth loss and grows with increasing age. In studies carried out by [37-39] confirmed an increase in the loss of teeth with increasing age.

The increase in edentulism with age seems to be a universal trend, creating the social imaginary figure of the old toothless elderly and the acceptance of tooth loss as a natural evolution of the human dentition, more or less in the sense of "we are born without teeth and die without teeth" [40].

Females had increased likelihood of tooth loss. This finding corroborates the results found in the study done by Indians of the Guarani tribe [39] and in studies of the general population [21, 41, 42]. A possible explanation would be the increased use of dental services by women, resulting in overtreatment would cause the loss of the tooth.

According to [43], increased tooth loss in women reveals some phenomena related to gender differences in health. Among these phenomena, we have the longest life expectancy of women

who would be prolonging exposure to determinants of edentulism or the greatest care that the woman spends with their health.

Although the social and environmental areas of study have been insignificant to tooth loss, studies are needed to better understand the influence of acculturation on tooth loss among indigenous.

Although in distinct and involving other human, social, economic and environmental factors timescale, contemporary indigenous groups, once in contact with national societies also experience socio-economic and ecological changes with strong potential to change oral health conditions [10, 44].

When related tooth loss and income observed insignificance, but the study shows that those who have a higher income have less teeth in the mouth. This is due to the elderly who have a higher income than adults and they have fewer teeth than adults. In our study, those who can read and write and who attends or has attended school any time in life, proved to be less chances of tooth loss. These conditions influence the pattern and type of use of oral health services. This model is reaffirmed by [39], where low education is strongly associated with greater tooth loss.

There are significant correlations between early tooth loss and social variables, such as the human development index, ethnicity, education, income under the minimum wage, lack of fluoridation of city water and living in cities with fewer than 10,000 inhabitants, which have already been reported in other studies [27].

However, it is difficult to compare studies of tooth loss among Indians and the general population because of the few relevant studies, different methodologies and different age groups.

Individuals who said they were satisfied with their oral health have fewer teeth. This result is related to the elderly, given the absence of teeth does not seem to impact on daily life. The adults in the study expressed dissatisfaction with oral health, but reported no problems related to functional activity and/or social.

Regarding the visit to the dentist was possible to observe an increased risk of tooth loss. According to [45], considering that the only way to experience tooth loss is to enter the dental care system (with the small exception of the self-extraction), since having access people have increased risk of tooth loss.

The main reason for the last visit was extraction. There are two hypotheses for [26]: firstly, those first decide to remove a tooth due to a specific problem and will extract it to the dentist or, on the other hand, decide to see a dentist first because of a problem specific and go to the dentist to see what can be done. In the first case, the specific symptoms and problems determine the loss of teeth. In the second case, the dental care determines tooth loss and problems and symptoms would have a direct effect on the use of dental services and indirect about losing teeth.

This latter fact reveals the importance of the function of the dentist in maintaining oral health, yet there to highlight all the influence of hegemonic paradigms and dominant ideology

contained in the dental practice of a particular historical moment [40]. This is one of the reasons why teeth are extracted could be recovered, since this alternative is considered the most convenient and also the most economical [18, 46].

In the daily routine of the people, the alterations produced by the loss of teeth should be the object of concern of the dental profession [47]. However, the approach of professionals, most often only considers the biological and restorative perspectives, ie, the restoration of teeth should be done according to the best principles of the technique, neglecting the effects of tooth loss in quality of life patients [48, 49].

Considering the results in multilevel analysis, it was possible to contemplate some of the complexity inherent in the health-disease process. This possibility ensured the simultaneous approach of contextual and individual factors in the analysis.

## 5. Conclusion

This study showed that: the average permanent teeth decreases considerably with advancing age, male sex is what has more teeth, self-perception is a satisfactory condition when there is tooth loss and oral health impacts are mainly perceived on who has more teeth. Access to services reveals a high proportion of the population that has already been to the dentist in public service for over three years and the reason for the visit was tooth extraction.

The differences between the oral health status of indigenous and non-indigenous constitute a framework of inequality between these two populations. It is necessary to rethink the routine visits to the dentist, since the factors associated with the presence of teeth are different for both individuals of the same age group, as different age groups. As well as the services of dental care does not have adequate infrastructure is sufficient to absorb the demand of the indigenous population, especially in adult and elderly.

Considering the epidemiological profile of the indigenous ethnic groups is important to highlight that are developed and put into public policies, in order to seek intervention strategies in oral health care.

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## References

- [1] Instituto Brasileiro de Geografia e Estatística. Censo Demográfico 2010. Características Gerais dos Indígenas. Resultados do Universo. Rio de Janeiro, p. 1-245, 2010. [ftp://ftp.ibge.gov.br/Censos/Censo\\_Demografico\\_2010/Caracteristicas\\_Gerais\\_dos\\_Indigenas/pdf/Publicacao\\_completa.pdf](ftp://ftp.ibge.gov.br/Censos/Censo_Demografico_2010/Caracteristicas_Gerais_dos_Indigenas/pdf/Publicacao_completa.pdf) (Acesso 26 fev. 2013).
- [2] Fundação Nacional de Saúde. Sistema de Informação da Atenção à Saúde Indígena de Pernambuco. Distrito Sanitário Especial Indígena de Pernambuco. Dados demográficos dos índios de Pernambuco. Recife, 2008.
- [3] Souza LC. "Doença que rezador cura" e "doença que médico cura": modelo etiológico Xukuru a partir de seus especialistas de cura. [Dissertação de Mestrado em Antropologia]. Recife: Universidade Federal de Pernambuco, 2004.
- [4] Fundação Nacional do Índio. Atualização do levantamento fundiário do TI Xukuru: relatório GT PP nº 374. Brasília, DF, 2007.
- [5] Mauricio, H.A. A Saúde Bucal do Povo Indígena Xukuru do Ororubá na Faixa Etária de 10 a 14 anos. [Dissertação Mestrado em Saúde Pública]. Recife: Centro de Pesquisas Aggeu Magalhães, Fundação Oswaldo Cruz, 2012.
- [6] Leite MS. Transformações e persistência: antropologia da alimentação e nutrição em uma sociedade indígena amazônica. Rio de Janeiro: Editora Fiocruz, 2007.
- [7] Coimbra Jr CEA, Santos RV. Saúde, minorias e desigualdade: Algumas teias de inter-relações, com ênfase nos povos indígenas no Brasil. *Ciência & Saúde Coletiva*, 2000; 5:125-132.
- [8] Coimbra Jr CEA, Flowers NM, Santos RV, Salzano FM. The Xavante in Transition: Health, Ecology, and Bioanthropology in Central Brazil. Ann Arbor: University of Michigan Press; 2002.
- [9] Fundação Nacional de Saúde. Política Nacional de Atenção à Saúde dos Povos Indígenas, 2ª Edição, Brasília:FUNASA/Ministério da Saúde; 2002.
- [10] Santos RV, Coimbra Jr CEA. Saúde e Povos Indígenas. Rio de Janeiro: Editora Fiocruz; 1994. p. 545-566.
- [11] Santos RV, Escobar AL. (eds.), 2001. Saúde dos povos indígenas no Brasil: Perspectivas atuais. *Cadernos de Saúde Pública*, 17(2) (número temático).
- [12] Basta PC, Orellana, JDY. Arantes R. Perfil epidemiológico dos povos indígenas no Brasil: notas sobre agravos selecionados. In: Garnelo L, Pontes AL. Saúde Indígena: uma introdução ao tema. Brasília: MEC-SECADI, 280 p., 2012.
- [13] Arantes R. Saúde oral de uma comunidade indígena Xavante do Brasil central: uma abordagem epidemiológica e bioantropológica. Dissertação (Mestrado em Saúde Pública) - Escola Nacional de Saúde Pública. Rio de Janeiro, 1998.

- [14] Arantes R. Saúde bucal dos povos indígenas no Brasil: panorama atual e perspectivas. In: Coimbra Jr CEA, Santos RV, Escobar AL (organizadores). *Epidemiologia e saúde dos povos indígenas do Brasil*. Rio de Janeiro: Abrasco/Fiocruz; 2003. p. 49-72.
- [15] Jovino-Silveira RC, Caldas Jr. AF, Souza EH, Gusmão ES. Primary reason for tooth extraction in a Brazilian adult population. *Oral Health Prev Dent* 2005; 3:151-7.
- [16] Pinto VG. Epidemiologia das doenças bucais no Brasil. In: Kriger L. (Org.) *Promoção da saúde bucal*. São Paulo: Artes Médicas-Aboprev; 1997.
- [17] Burt BA, Eklund AS. *Dentistry, dental practice and the community*. 4th Ed. Philadelphia: W.B. Saunders Company; 1992.
- [18] Pinto VG. *Saúde bucal coletiva*. 4a Ed. São Paulo: Editora Santos; 2000.
- [19] Barros AJD, Bertoldi AD. Desigualdades na utilização e no acesso a serviços odontológicos: uma avaliação em nível nacional. *Ciência Saúde Coletiva* 2002; 7:709-17.
- [20] Cabral ED, Caldas Jr. AF, Cabral HA. Influence of the patient's race on the dentist's decision to extract or retain a decayed tooth. *Community Dent Oral Epidemiol* 2005; 33:461-6.
- [21] Barbato PR, Nagano HCM, Zanchet FM, Boing AF, Peres MA. Perdas dentárias e fatores sociais demográficos e de serviços associados em adultos brasileiros: uma análise dos dados do Estudo Epidemiológico Nacional (Projeto SB Brasil 2002-2003). *Cad Saúde Pública*. 2007; 23(8):1803-14.
- [22] Moynihan P, Bradbury J. Compromised Dental Function and Nutrition. *Nutricion, United States*, 2001 feb; 17(2): 177-178.
- [23] N'Gom PI, Woda A. Influence of impaired mastication on nutrition. *J. Prosthet Dent, United States*, 2002 feb; 87(6): 667-673.
- [24] Marcenos W, Steele JG, Sheiham A, Walls AWG. The relationship between dental status, food selection, nutrient intake, nutritional status, and body mass index in older people. *Cad Saúde Pública, Rio de Janeiro*, 2003 mai-jun; 19: 809-816.
- [25] Musacchio E, Perissinotto E, Binotto P, Sartori L, Silva-Netto F, Zambon S, et al. Tooth loss in the elderly and its association with nutritional status, socio-economic and lifestyle factors. *Acta Odontol Scand* 2007; 65:78-86.
- [26] Gilbert GH, Miller MK., Duncan RP, Ringelberg ML, Dolan TA, Foerster U. Tooth-specific and person level predictors of 24-month tooth loss among older adults. *Community Dent Oral Epidemiol* 1999; 27:372-85.
- [27] Frazão P, Antunes JLF, Narvai PC. Perda dentária precoce em adulto de 35 a 44 anos de idade. Estado de São Paulo, Brasil, 1998. *Rev Bras Epidemiol*. 2003; 6(1): 49-57.



- [28] Slade GD, Spencer AJ, Roberts-Thomson KF. Australia's dental generations: the national survey of adult oral health 2004-06. Canberra: Australian Institute of Health and Welfare 2007.
- [29] Williams S, Jamieson L, MacRae A, Gray C. Review of Indigenous oral health. 2011. [http://www.healthinfonet.ecu.edu.au/oral\\_review](http://www.healthinfonet.ecu.edu.au/oral_review) (Acesso 20 jan. 2013).
- [30] Costa AM *et al.* Projeto de pesquisa: Análise das condições de vida, saúde e vulnerabilidade do povo indígena Xukuru do Ororubá como ferramenta para as ações de atenção primária de saúde. Projeto submetido ao edital FACEPE 09/2008 - Pesquisa para o SUS: Gestão compartilhada em saúde PPSUS – Pernambuco MS/CNPQ/FACEPE/SES. Recife: CPqAM/FIOCRUZ, 2009.
- [31] Costa AM *et al.* Projeto de pesquisa: Saúde e condições de vida do povo indígena Xukuru do Ororubá, Pesqueira – PE. Projeto submetido ao Edital CNPq – Chamada: Edital MCT/CNPq N° 014/2008 – Universal. Recife: CPqAM/FIOCRUZ, 2009.
- [32] Brasil. Ministério da Saúde. Projeto SB Brasil 2003: Condições de saúde bucal da população brasileira 2002-2003: resultados principais. Brasília: Ministério da Saúde; 2004.
- [33] Brasil. Ministério da Saúde. Projeto SB Brasil 2010 – Manual da Equipe de Campo. Brasília – DF: 2009. [www.saude.gov.br/bucal](http://www.saude.gov.br/bucal) (Acesso 15 jan. 2013).
- [34] World Health Organization. Oral health surveys: basic methods. 4 ed. Geneva; 1997.
- [35] Gschlöbl S, Czado C. Modelling count data with overdispersion and spatial effects. *Statistical papers*, 2008; 49(3): 531-532.
- [36] Victora CG, Huttly SR, Fuchs SC, Olinto MT. The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. *Int J Epidemiol* 1997; 26: 224-227.
- [37] Ulhôa Netto, E.; Ferreira, T. F. L.; Drummond, M. M.; Sanchez, H. F.; Tooth loss and need of denture in Pataxó Natives. *Rev Gaúcha Odontol.*, 2012 abr./jun; 60(2): 195-201.
- [38] Arantes R, Santos RV, Coimbra Jr CEA. Saúde bucal na população indígena Xavante de Pimentel Barbosa, Mato Grosso, Brasil. *Cad. Saúde Pública*, 2001 mar.-abr; 17(2): 375-384.
- [39] Alves Filho P, Santos RV, Vettore M V. Saúde bucal dos índios Guarani no Estado do Rio de Janeiro, Brasil. *Cad. Saúde Pública*, 2009 jan; 25(1): 37-46.
- [40] Moreira RS, Nico LS, Tomita NE. O risco espacial e fatores associados ao edentulismo em idosos em município do Sudeste do Brasil. *Cad. Saúde Pública*, 2011 out; 27(10): 2041-2053.
- [41] Susin C, Oppermann RV, Haugejorden O, Albandar JM. Tooth loss and associated risk indicators in an adult urban population from south Brazil. *Acta Odontol Scand* 2005; 63:85-93.

- [42] Silva DD, Rihs LB, Sousa M LR. Fatores associados à presença de dentes em adultos de São Paulo, Brasil. *Cad. Saúde Pública*, Rio de Janeiro, 2009 nov; 25(11): 2407-2418.
- [43] Moreira RS. Perda dentária em adultos e idosos no Brasil: a influência de aspectos individuais, contextuais e geográficos. [Tese Mestrado Acadêmico em Saúde Pública]. São Paulo: Faculdade de Saúde Pública, Universidade de São Paulo, 2009.
- [44] Wirsing R. The health of traditional societies and effects of acculturation. *Current Anthropology* 1985; 26: 303-322.
- [45] Gilbert GH, Duncan RP, Shelton BJ. Social determinants of tooth loss. *Health Service Research* 2003; 38: 1843-1862.
- [46] Guimarães MM, Marcus B. Expectativa de perda de dente em diferentes classes sociais. *REVCROMG* 1996; 2(1): 16-20.
- [47] Chianca TK, Deus MR, Dourado AS, Leão AT, Vianna RBC. El impacto de la salud bucal en calidad de vida. *Rev Fola/oral* 1999; 16: 96-102.
- [48] Wolf SMR. O significado da perda dos dentes em sujeitos adultos. *Rev Assoc Paul Cir Dent.* 1998; 52(4): 307-315.
- [49] Vargas AMD, Paixão HH. Perda dentária e seu significado na qualidade de vida de adultos usuários de serviço público de saúde bucal do Centro de Boa Vista, em Belo Horizonte. *Cien Saude Colet* 2005; 10(4): 1015-1024.

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