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Full Length Research Paper

# Xerostomy, Caries and Periodontal Disease Risk Studies in Black People with HIV/Aids Xerostomy and Periodontal Disease in Black People

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Aids (Acquired Immunodeficiency Syndrome), recognized in 1981 by the CDC (Centers for Disease Control and Prevention) of Atlanta – United States of America (USA), has the HIV (Human Immunodeficiency Virus) as an etiologic agent. According to the Aids worldwide epidemic report<sup>2</sup>, Brazil has one third of people living with HIV in Latin America. In 2005, about 620,000 lived with AIDS in the country. About 180 thousand have already developed the symptoms and are being treated with highly active antiretroviral therapy (HAART). Annually, 30 thousand new cases are registered and one third of them affect people in their 2<sup>nd</sup> and 3<sup>rd</sup> decades of life, and each year, 11 thousand people die in the country due to the disease, however the data according to the race/color criterion are still scarce. In relation to the Afro-descendant population, bad evidences point to a growing increase in the HIV/Aids cases regarding this population. Thus, considering the scarcity of researches regarding the Afro-descendant population, and especially when related to changes in the oral cavity, our proposal aims to diagnose and compare the presence of the xerostomia, dental cavity and periodontal disease risks among Afro-descendant and Caucasian people living with HIV/Aids.

**Keywords:** HIV/Aids; Xerostomy; Periodontal Disease in Black People

## INTRODUCTION

Aids (Acquired Immunodeficiency Syndrome), recognized in 1981 by the CDC (Centers for Disease Control and Prevention) of Atlanta – United States of America (USA), has the HIV (Human Immunodeficiency Virus) as an etiologic agent. According to the Aids worldwide epidemic report<sup>2</sup>, Brazil has one third of people living with HIV in Latin America. In 2005, about 620,000 lived with AIDS in

the country. About 180 thousand have already developed the symptoms and are being treated with highly active antiretroviral therapy (HAART). Annually, 30 thousand new cases are registered and one third of them affect people in their 2<sup>nd</sup> and 3<sup>rd</sup> decades of life, and each year, 11 thousand people die in the country due to the disease, however the data according to the race/color criterion are still scarce. In relation to the Afro-descendant population, bad evidences point to a growing increase in the HIV/Aids cases regarding this population. Thus, considering the scarcity of researches regarding the Afro-descendant

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population, and especially when related to changes in the oral cavity, our proposal aims to diagnose and compare the presence of the xerostomia, dental cavity and periodontal disease risks among Afro-descendant and Caucasian people living with HIV/Aids.

## **METHOD**

The study was conducted with HIV/Aids Afro-descendant who did not have HIV/Aids, after approval by the CEP/ICS/UNIP No. 076/09. 39.

Group I: Afro-descendant, HIV/Aids patients, with serology confirmed through Elisa and Western Blot serological tests. Group II: Afro-descendant patients, not knowingly HIV-infected (Control Group).

Data referring to gender, age, exposure category, HIV year exposure, symptoms, systemic manifestations, oral manifestations, HAART use, T-CD4 lymphocytes, viral load, habits, salivary flow, bacterial plaque ratio, bleeding ratio and CPO were collected. This information was collected during the anamnesis in the clinical examination.

For the Groups I, II, the measurements of the salivary flow, pH, buffer capacity, CPO, plaque ratio and probing depth in all patients were carried out, through the collection of the saliva stimulated for 5 minutes, according to the salivary test method DentoBuff®.

To collect the saliva sample, the individual should be fasting for a period of 2 hours before being submitted to the sample collection, chewing a paraffin-base gum which is part of the kit and all saliva accumulated in the first 30 seconds should be rejected and subsequently, a new timing of five minutes is started, and the patient continues chewing the gum.

The salivary volume was divided by the collecting time and compared to a table which comes with the Kit for the flow assessment, being: normal - from 1.6 to 2.3 ml/min, intermediate (moderate) - from 1.0 to 1.5 ml/min and low (severe) - less than 1.0 ml/min.

Using the same saliva sample collected for the previous flow test, 1.5 ml of saliva was withdrawn from the measuring cup, using a disposable syringe, and put into a flask with an acid solution which was previously into the flask, also adding 4 drops of indicator, using the dropper and stirring the mixture for 10 seconds comparing to the color scale. With the number determined by the color in the scale, assessments on the salivary buffer capacity were carried out.

The prophylaxis of the dental elements was performed through a Robinson brush and a rubber cup with pumice stone. Clinical examinations of the dental elements were carried out, assessing the presence of dental cavity of the dental elements, absent teeth and filled teeth.

The plaque ratio was determined through a plaque evidencing agent (erythrosine tablet), which after its suction promotes the coloring in the presence of bacterial

plaque in the dental element. This test result was noted in relation to the plaque and assessed through the Ainamo and Bay Test (1975), in the presence or absence of plaque in a binomial standard (dichotomic counting). The visible plaque received the mark "1", while no visible plaque receives mark "0."

The bleeding ratio was determined through the verification of the visible bleeding points, up to 15 seconds after the survey. The number of bleeding dental faces was divided by the total number of dental faces, obtaining the bleeding ratio. This test result was registered and also assessed by the Ainamo and Bay Test (1975).

The periodontal clinical examination was performed by means of relative insulation, using a 1 to 10 mm millimeter probe. The depth measurement was registered in a clinical record.

The statistical analysis was performed through Minitab 15.0 and SAS 9.1 software and separately for the Afro-descendant. For the quantitative variables, the groups were compared with the Student t test (Bussab and Morettin, 2002), once the samples were big enough so that the central limit theorem could be used. For the qualitative variables the chi-square test of traditional homogeneity (asymptotic, Bussab and Morettin, 2002) was used, when the observation number in all cells was greater than or equal 5. When that did not happen, the Fisher's exact test was used (Agresti, 2002) when the number of the variable categories was equal to 2 and the exact chi-square test was used in the other situations. In all tests a significance level of 5% was considered.

## **RESULTS**

It was obtained a sample of patients who were under dental treatment in the Universidade Paulista UNIP - Campus Indianópolis, being 82 HIV Afro-descendant patients, 80 non-HIV Afro-descendant patients.

Among the 80 Afro-descendant patients of group II, 51 (63.8%) were female, while among the 82 patients from group I (HIV), 32 (39.0%) were female. In group II, the average age was of 55.2 years with standard deviation (SD) of 11.6 years and in the HIV group, the average age was of 40.6 years with standard deviation of 9.7 years. In both groups, patients were predominantly heterosexual (87.5%) in the control group and 61.0% in the HIV group.

In both groups, patients were predominantly heterosexual (95.0% in the control group and 62.9% in the HIV group).

In group II, it was observed an average CPO of 19.0 (SD = 5.8), an average bacterial plaque ratio of 48.4% (SD = 28.6%) and an average bleeding ratio of 31.9% (SD = 22.9%). In group I (HIV), it was observed an average CPO of 17.8 (SD = 7.6), an average bacterial plaque ratio of 57.9% (SD = 23.9%) and an average bleeding ratio of 42.5% (SD = 26.3%) (Table 1).

**Table 1.** Mean, standard deviation and p value for some variables between patients

Black					White				
Variable	Group	Average	D.P.	P	Variable	Group	Average	D.P.	P
CPO-D	Control	19.0	5.8	0.2868	CPO-D	Control	18.0	5.7	0.0354
	HIV	17.8	7.6			HIV	20.2	6.7	
Plaque Index	Control	48.4	28.6	0.0234	Plaque Index	Control	48.5	27.0	0.0011
	HIV	57.9	23.9			HIV	64.1	28.2	
Bleeding Index	Control	31.9	22.9	0.0067	Bleeding Index	Control	34.8	25.4	0.0003
	HIV	42.5	26.3			HIV	51.9	29.2	

**Table 2.** Joint frequency distribution of absolute and relative variables salivary flow for patients and Group melanodermic and whites.

Black Salivary Flow						White Salivary Flow					
Group	Severe	Moderate	Low	Normal	Total	Group	Severe	Moderate	Low	Normal	Total
Control	27 (33.8)	15 (18.8)	5 (6.3)	33 (41.3)	80 (100.0)	Control	31 (38.8)	4 (5.0)	1 (1.3)	44 (55.0)	80 (100.0)
HIV	16 (19.5)	23 (28.1)	9 (11.0)	34 (41.5)	82 (100.0)	HIV	27 (43.6)	0 (0.0)	0 (0.0)	35 (56.5)	62 (100.0)
Total	43 (26.5)	38 (23.5)	14 (8.6)	67 (41.4)	162 (100.0)	Total	58 (40.9)	4 (2.8)	1 (0.7)	79 (55.6)	142 (100.0)

**P=0.1309** **P=0.2501**

The percentage observed in patients with normal salivary flow was 41.3% in group II and 41.5% in group I (HIV), while those with moderate salivary flow or worse was 52.6% in the control group and 47.6% in the HIV group (Table 2).

Among the patients in the control group, 60.0% were classified as P1 for periodontal diseases and only 2.5% were classified as P3 or P4. Among the HIV patients, these percentages were 35.4% and 15.8%, respectively (Table 3).

## DISCUSSION

The global epidemiological data, according to the race/color criterion are still limited. The social and economic inequalities faced by the Afro-descendant population and even their direct influences regarding the vulnerability of this population group to HIV/Aids should be recognized. The increase in the number of death cases among Afro-descendant people is higher comparing to

Caucasian people. Additionally, Afro-descendant people have a higher rate of hospitalization compared to Caucasian people. Afro-descendant people are distinct among other patient groups, because, due to social and cultural differences there may be a delay in the access to antiretroviral therapy and some studies show that Afro-descendant people seem to have a lower absorption of HAART (UNDP 2014; MHBHSN STD and AIDS. 2011; Oramasionwu et al., 2009).

In our research, the Afro-descendant, Caucasian and the control groups' patients do not seem to be homogeneous regarding age, gender and exposure. Among the 80 Afro-descendant patients from the control group, 63.8% were female, while among the 82 patients from HIV group, 39.0% were female. In group II, the average age was of 55.2 years with standard deviation (SD) of 11.6 years and in the HIV group, the average age was of 40.6 years with standard deviation of 9.7 years.

Patients who have HIV/Aids present a higher rate of salivary flow reduction and, consequently, a higher rate of xerostomia. Xerostomia can be a symptom of several

**Table 3.** Joint distribution of absolute and relative frequencies between the variables and periodontal disease group for black patients.

Black Periodontal Disease						White Periodontal Disease					
Group	P1	P2	P3	P4	Total	Group	P1	P2	P3	P4	Total
Control	48 (60.0)	30 (37.5)	2 (2.5)	0 (0.0)	80 (100.0)	Control	39 (48.8)	41 (51.3)	0 (0.0)	0 (0.0)	80 (100.0)
HIV	29 (35.4)	40 (48.8)	11 (13.4)	2 (2.4)	82 (100.0)	HIV	22 (35.5)	13 (21.0)	27 (43.6)	0 (0.0)	62 (100.0)
<b>Total</b>	<b>77 (47.5)</b>	<b>70 (43.2)</b>	<b>13 (8.0)</b>	<b>2 (1.2)</b>	<b>162 (100.0)</b>	<b>Total</b>	<b>61 (43.9)</b>	<b>54 (38.0)</b>	<b>27 (19.0)</b>	<b>0 (0.0)</b>	<b>142 (100.0)</b>

*P=0.001* *P<0.0001*

**Table 4.** Joint distribution of absolute and relative frequencies between the variables and salivary flow group for black patients 50 years of age or older and female.

50 years or more Salivary Flow						Female Gender Salivary low					
Group	Severe	Moderate	Low	Normal	Total	Group	Severe	Moderate	Low	Normal	Total
Control	22 (32.8)	10 (14.9)	5 (7.5)	30 (44.8)	67 (100.0)	Control	4 (27.5)	3 (15.7)	3 (5.9)	16 (51.0)	51 (100.0)
HIV	2 (12.5)	9 (56.3)	2 (12.5)	3 (18.8)	6 (100.0)	HIV	5 (15.6)	3 (40.6)	3 (9.4)	11 (34.4)	32 (100.0)
<b>Total</b>	<b>24 (28.9)</b>	<b>19 (22.9)</b>	<b>7 (8.4)</b>	<b>33 (39.8)</b>	<b>63 (100.0)</b>	<b>Total</b>	<b>9 (22.9)</b>	<b>11 (25.3)</b>	<b>6 (7.2)</b>	<b>27 (44.6)</b>	<b>83 (100.0)</b>

*P=0.0032* *P=0.0500*

diseases or a side effect to the use of medications. It consists of temporary or definitive reduction of the salivary flow or the absence of saliva occurring due to the immunological system dysfunction caused by the HIV or as a side effect of HAART, especially among the medication that contain reverse transcriptase inhibitors, or when the T-CD4 lymphocytes counting is lower than 200mm<sup>3</sup> (Julio César and Giovani 2014; Guggenheimer and Moore 2003; Navazesh et al., 2009; Jané-Salas et al., 2014; Cavasin Filho et al., 2009; Castro et al., 2004).

Table 2 presents the joint frequency of distributions between the salivary flow variables group and the p value

of the salivary flow distribution comparison in the two groups of Afro-descendant patients. There is no evidence that the salivary flow distribution is different in the two groups (p = 0.1309). 50-year female patients, individuals of the HIV group present a higher proportion of moderate salivary flow rate and a smaller proportion of normal salivary flow than the patients in the control group. Agreeing with NAVAZESH et al. (2004)<sup>9</sup> discoveries affirming that HIV-positive women have a significantly higher risk for xerostomia of a hypofunction of the salivary gland than HIV-negative women. Evidences of salivary flow reduction may also be associated with or influenced mainly

by underlying diseases or mainly by the immunosuppression and or even by HIV itself, being more evident in Afro-descendant individuals, becoming a major facilitator of the presence of exacerbation of oral disease, especially candidiasis, and periodontal disease.

Dental cavity is a multifactorial disease, being a pathological destruction process located in the dental tissues by microorganisms, and requires a susceptible host, a cryogenic oral microbiota and a proper substratum that should be present for a period of time, enough for causing the demineralization of the dental structures. (Weyne 1989; Ribeiro et al., 2002).

Ribeiro et al., (2002)<sup>15</sup> assessed individuals living with HIV, the quality and quantity of biofilm over the dental surface and diagnose the activities of the dental cavity and gingivitis diseases.

Phelan, (2004)<sup>16</sup> correlated the infection by the HIV with the dental cavities in women, and verified that the antiretroviral therapy was not identified as a risk factor for dental cavity.

In our sample, the Afro-descendant HIV group seemed to present a higher proportion of patients with more severe periodontal diseases, but the groups do not seem to be different regarding the salivary group. Among the Afro-descendant patients from the control group, 60.0% were classified as P1 for periodontal diseases and only 2.5% were classified as P3 or P4. Among the HIV Afro-descendant patients, these percentages were 35.4% and 15.8%, respectively.

The joint frequency distributions between the periodontal disease and the group variables and the p value of the comparison of the periodontal disease distribution in both groups, and it was noticed that patients from the HIV group tend to present a higher proportion of individuals with more severe periodontal diseases ( $p < 0.0001$ ).

In our sample, the HIV/Aids Afro-descendant group showed, on average, higher bleeding ratio and higher bacterial plaque ratio than the control group, but the groups do not seem to differ regarding the CPO. In the control group, it was observed an average CPO of 19.0 (SD = 5.8), an average plaque ratio of 48.4% (SD = 28.6%) and an average bleeding ratio of 31.9% (SD = 22.9%). In group HIV, it was observed an average CPO of 17.8 (SD = 7.6), an average plaque ratio of 57.9% (SD = 23.9%) and an average bleeding ratio of 42.5% (SD = 26.3%).

The presence of dental cavity in individuals infected by HIV is mainly favored by xerostomia, this being an important modifying factor. About 30% to 40% of the infected individuals presented moderate xerostomia and severe xerostomia associated with the effects of the medications, such as the didanosine, a medication present in almost all HAART medications for the treatment of individuals with HIV/aids. (Johnson 2010).

Considering the results obtained, it can be concluded that among the 50-year Afro-descendant patients or older, the normal salivary flow is lower in the HIV group than in

the control group. On average, the CPO variable value is higher among HIV Afro-descendant patients than in the control group. In Afro-descendant patients, there are no evidences that the CPO average is different between both groups. When compared between them, the Caucasian patients present higher CPO than the Afro-descendant group. For both races, on average, the bleeding ratio and the plaque ratio are higher among HIV patients than the control group. We suggest a more rigorous and effective clinical control in relation to the Afro-descendant population due to the marked increase in the number of cases, by implementing effective prevention programs that establish the promotion of health and proper treatments, aiming to improve life quality of these individuals

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