SCIENTIFIC ARCHIVES OF DENTAL SCIENCES (ISSN: 2642-1623)

Volume 3 Issue 9 September 2020

Research Article

Oral Manifestations, DMFT Index and Medical Profile in HIV/AIDS Patients: A Cross-Sectional Study

Wilber Edison Bernaola-Paredes[1,2]*, Caroline José Luiz[3], Marina Veronese Martello[3], Valdener Bella Filho[4], Michele Gassen Kellermann[3] and André Guollo[3]

[1]Department of Stomatology, Division of Oral Diagnosis, School of Dentistry, University of Sao Paulo (USP), Sao Paulo, Brazil

[2]Department of Radiation Oncology, A.C. Camargo Cancer Center, Sao Paulo, Brazil

[3]Department of Stomatology, School of Dentistry, Community University of Chapeco Region (UNOCHAPECO), Santa Catarina (SC), Brazil

[4]School of Dentistry, University "Nove de Julho" (UNINOVE), Sao Paulo, Brazil

***Corresponding Author:** Wilber Edison Bernaola-Paredes, Department of Stomatology, Division of Oral Diagnosis, School of Dentistry, University of Sao Paulo (USP), Sao Paulo, Brazil.

Received: July 15, 2020; **Published:** August 19, 2020

Abstract

Introduction: The HIV retrovirus compromises the individual's immune system, leading to a systemic condition that is vulnerable to opportunistic infections and pathological processes. Highly Active Antiretroviral therapy (HAART) decreases the HIV viral load and increases CD4 cell count, resulting in less frequent opportunistic infections. As regards examination of dental status, only a few studies available have been conducted in the Brazilian population.

Purpose: The aim of the present study was to evaluate the prevalence of oral lesions and DMFT index in patients with HIV.

Methods: AThis was a cross-sectional descriptive observational study, conducted in the Supportive and Specialized Care Service in HIV/AIDS - Chapeco/Santa Catarina (SC), Brazil, and based on oral evaluation (soft tissues and teeth) in patients over 18 years of age who agreed to participate in the study. We evaluated 28 patients, with a mean age of 40 years, predominantly male (61%).

Results: Ten patients (35.7%) had oral lesions, including melanocytic pigmentation (N = 1), leukoedema (N =3), oral syphilis (N = 1), nonspecific ulcer (N = 1), nicotinic stomatitis 2), prosthetic stomatitis (N = 1), and extra-nodal lymphoma (N = 1); the mean DMFT value found was 10 (range 0 to 22).

Conclusion: Based on the results of this study population, it was possible to conclude a high prevalence of oral lesions and the result of the DMFT lower than the mean for the age group in the state of SC, Brazil.

Keywords: *Oral Manifestations; Dental Caries; HIV Seropositivity; Prevalence; Virus Infections*

Introduction

Infection with the Human Immunodeficiency Virus (HIV) results in a reduction of CD4+ T lymphocytes counts, which begins gradually and increases progressively, making HIV positive patients susceptible to opportunistic infections and oncological processes [1]. Oral manifestations are caused by immunological deterioration observed in 30-80% of patients with HIV [2].

According to recent literature report on this topic, 36.7 million people live with HIV worldwide, and those in Brazil are included in approximately 830,000 of the cases. Of these, 87% have been diagnosed, 55% of the total are being treated and 50% of all estimated people living with HIV have suppressed viral loads.

Oral manifestations of the disease are common, depending on the patient´s immunosuppression status and these manifestations could be considered infection markers and predictors of the disease progression [1]. Among the oral lesions found in infected patients, the outstanding types are angular cheilitis, erythematous candidiasis, oral herpes, pseudomembranous candidiasis, Kaposi´s

sarcoma, oral hairy leukoplakia, among others. Highly Active Antiretroviral Therapy (HAART) has become frequent treatment for HIV infection, contributing to a reduction in the clinical prevalence of these manifestations [1,3,4].

The HAART was introduced in 1996 and over the course of time; over 30 different drugs from six classes of drugs have been considered for use as combined therapy. Those act at various points in the viral life cycle and are administered with the aim of reducing viral load to undetectable levels in order to increase CD4+ T lymphocyte counts, allowing recovery of the individual´s immune system [1,5].

Some authors have suggested that HIV-infected patients are at greater risk for dental caries. Navazeh., *et al*. [6] reported that an increase in the dental caries index would be associated with the reduction in salivary flow caused by antiretroviral therapy. Other extrinsic factors such as diet, inadequate oral hygiene, socioeconomic status, lack of caregiver knowledge may be additional risk factors [1].

In the study conducted by Soares., *et al*. [6], the DMFT index (which measures the total number of decayed, missing and filled/restored permanent teeth per individual) in HIV patients was observed to be higher than another index obtained in one of the most important published studies with reference to this issue, namely the Project Smiling Brazil (SB)-Brazil 2003 conducted in the Brazilian population.

For these reasons it was necessary to obtain the clinical information of the main oral manifestations found in the HIV population, in order to have accurate information about their dental status, to enable better control of oral health, and therefore, to improve their quality of life.

Purpose of the Study

The purpose of this study was to assess the prevalence of oral lesions and dental status by means of the DMFT index of patients infected by HIV, compared with their clinical data and socioeconomic profile.

Materials and Methods

Study design and ethical considerations

The methodological design was observational, descriptive and cross-sectional study. The population was selected in a non-randomized manner, at a Specialized Care Services for attendance of HIV positive patients, at Chapeco, Santa Catarina, Brazil. Data records were retrieved from May 2018 to August 2018.

This study was submitted for ethical approval by the institution with Acceptance Protocol Number 2.621.909, and other documents were signed in order to guarantee the confidence of the data records. This cross-sectional study was reported according to the STROBE statement [7].

Participants and treatment protocol

In order to determine the final sample, inclusion criteria were established; the sample was composed of HIV positive patients, >18 years, with or without history of HAART treatment at time of attendance, during the above-mentioned period. Data were collected from patients with HIV at any stage of the disease.

Clinical measurements

Data such as age, sex, time since diagnosis, antiretroviral therapy protocol, counts of CD4 lymphocytes and viral load were collected from clinical records, provided by the team that provided supportive care of patients. Moreover, the oral examination (soft tissues and teeth) was performed with wooden spatula, sterile gauze and use of flashlight for better viewing. Dental status was described, based on the DMFT index sheets as suggested in the SB-2010 field team manual, and the results were described as the average of the sum of values obtained in the records.

Statistical analysis

Data analysis was performed by SPSS (version 20.0). The variables such as age data were categorized. Association between variables was measured, with a 95% confidence interval.

Results

In total, 28 patients participated in this study with age range between 18 and 70 years. Of the total sample included, 22 patients were on HAART and the other 6 were evaluated on the day of HIV diagnosis; and were classified as being in pre-treatment. Table 1 shows epidemiological data such as socioeconomic profile of the population studied. Relative to the gender of patients included, there was a predominance of males (60.7%). The majority of patients worked in the industrial area (35.7%) and the marital status of ten patients was single (35.7%).

		N (N = 28)	P (%)
Age	18 - 30	7	25.0
	31 - 43	9	32.1
	44 - 56	9	32.1
	57 - 70	3	10.7
Gender	Female	11	39.3
	Male	17	60.7
Profession	Unemployed	5	17.9
	Retired	4	14.3
	Freelance worker	9	32.1
	Industrial worker	10	35.7
Marital status	Married	5	17.9
	Not married	10	35.7
	Divorced	5	17.9
	Stable Union	8	28.6
Education	Incomplete primary school	5	17.9
	Complete primary school	12	42.9
	Complete high school	10	35.7
	University degree	1	3.6
Income	< 1 minimum salary	4	14.3
	1 - 3 minimum salaries	18	64.3
	3 - 5 minimum salaries	1	3.6
	No income	5	17.9

Table 1: Socioeconomic profile of patients included.

As regards education, the majority of the population (42.9%) had completed primary education. Only 3.6% reported that they had high school education, possibly because of the low participation of this portion of the population in our study, due to fear or embarrassment. Thus, relative to family income, 64.3% of the sample reported that they received 1 to 3 minimum wages monthly.

Moreover, with reference to smoking and alcohol drinking habits, 21.4% of patients reported smoking and drinking, with the average frequency of alcohol use once a week. Six patients (21.4%) had systemic changes that were distributed into the following types of disease: diabetes and hypertension (3.6%), and others (14.3%), classified as hypothyroidism, hepatitis B and C as shown in table 2.

		N (N = 28)	P (%)
Smoking	Yes	6	21.4
	No	22	78.6
Alcohol consumption	Yes	6	21.4
	No	22	78.6
Systemic disorder	Yes	6	21.4
	No	22	78.6
Type of systemic condition	Absence	23	82.1
	Diabetes Mellitus	1	3.6
	Others such as Hepatitis B, C, E and Hyperthyroidism	4	14.3

Table 2: Medical profile and life style data of patients included.

Table 3 describes the results found in relation to the CD4 count, which was distributed into the following variables: CD4 higher than 200 cells/mm^3 (75%); CD4 fewer than 200 cells/mm^3 (17.9%); and without CD4 count (7.1%). Regarding viral load, 46.4% of patients had undetected viral load, 28.6% with viral load less than 40 to 10,000 copies of RNA/ml, 17.9% with viral load higher than 10,000-30,000 copies of RNA/ml and 7.1% had no viral load assessment. Information in the table also describes the patients who started using HAART (82.1%), and the duration of therapy. Table 4 shows the data for DMFT index. The mean DMFT index found in this study was 10 (ranging from 0 to 22).

Data with reference to prevalence of xerostomia in entire population, 14 patients (50%) pre-treated or using antiretroviral therapy (HAART) reported dry mouth sensation. While xerostomia was associated with the beginning of HAART, it was found in 12 patients (52%).

In 10 patients (35.7%), oral manifestations were observed, such as extra-nodal lymphoma (one patient) (Figure 1); areas of pigmentation in patients who underwent HAART (one patient) (Figure 2); leukoedema (two patients); non-specific ulcerated areas (four patients) (Figure 3); nicotinic stomatitis (two patients); in addition to patients with oral syphilis (three patients) and prosthetic stomatitis (one patient), as visualized in figure 4.

		N (N = 28)	P (%)
CD4 cell counts	Higher than 200 cells/ mm^3	21	75,0
	Lower than 200 cells/mm^3	5	17.9
Viral load	Absence	2	7.1
	Absence	13	46.4
	< 40 to 10,000 copies of RNA/ml	8	28.6
	> 10,000 to 30,000 copies of RNA/ml	5	17.9
	Did not have viral load evaluation	2	7.1
HAART patients involved	Yes	23	82.1
	No	5	17.9
Starting with HAART	Pre-treatment	5	17.9
	1 - 66 months	11	39.3
	67 - 132 months	7	25.0
	133 - 197 months	5	17.9

Table 3: Data of laboratory characteristics associated with HIV and the use of HAART in the studied population.

		N (N = 28)	P (%)
DMFT index	0 - 6	13	46.4
	7 - 10	3	10,7
	13 - 17	6	21.4
	18 - 22	6	21.4

Table 4: Median DMFT index of the studied population.

Figure 1: Extra-nodal lymphoma lesions in the hard palate and maxillary bone observed in positive HIV patient.

Figure 2: Oral pigmentation in the lower lip mucosa and buccal mucosa in patient who underwent HAART treatment.

Figure 3: Non-specific ulcerated areas in oral mucosa: A) Floor of the mouth; B) retromolar area and C) ventral region of tongue.

Figure 4: Other oral lesions in positive HIV patients, such as A) Prosthetic stomatitis and B) oral syphilis in lower lip mucosa.

Relative to correlation between the date of starting with HAART and the type of oral lesion, a statistically significant result was observed only for pre-treatment patients and those with fungal, viral and bacterial lesions, with p = 0.034 shown in table 5. Patients with time of HAART use between 1 and 66 months had a higher frequency of oral lesions, these being pigmented lesions, nicotinic stomatitis and leukoedema.

		Type of oral mucosa lesions			
Date of starting with HAART		**Absence**	**Pigmented lesions, nicotinic stomatitis, hairy tongue, leukoedema**	**Fungi, viruses and bacterial lesions**	**Neoplasm lesions**
	Pre-treatment	2	1	2	0
	1 - 66 months	5	5	1	0
	67 - 132 months	6	0	0	1
	133 - 197 months	5	0	0	0

Table 5: Correlation of date of starting with HAART treatment with type of oral lesion.

While the CD4 count was correlated with the presence of oral lesions, 80% of patients had CD4 counts higher than 200 cells/mm^3 and 20% had CD4 counts lower than 200 cells/mm^3. Moreover, with reference to the viral load count and the presence of oral lesions, the data were distributed as follows: 50% patients with undetectable viral load, 20% with viral load higher than 40 to 10,000 copies of RNA/ml and 30% with viral load of over 10,000 - 30,000 copies of RNA/ml.

Male gender (80%) and the age group between 31 to 43 years old showed the highest prevalence of oral lesions. As regards smoker patients, lesions were observed in 30% of them.

Discussion

About 36.9 million people worldwide were living with HIV in 2017. Approximately 21.7 million people had access to antiretroviral therapy. Nowadays, with the introduction of new therapies, HIV infection has changed from being a fatal disease to being a chronic condition. Thus, in the last few years, the challenge to provide accurate treatment has grown, for both patients and health care professionals, who in this new context of chronicity must face the disease as an infection, instead of an imminent cause for death.

In the present study, there was a predominance of the male gender (60.7%). Similar results were found in a previous study [8], in which 82.7% of the population selected were male, with a mean age of 36.6 years. Another study [9] reported a mean age of 39.38 in their study conducted with HIV positive patients in the state Rio Grande do Sul, in the South of Brazil.

Whereas our results showed a rate of 21.4% for alcohol drinkers and smokers; besides, similar data were observed in previous studies, in which 27.7% of patients were smokers and 18.1% were alcohol drinkers [10].

Relative to tobacco use, 51.3% of the sample were reported [9] to be users. Moreover, alcohol use was mentioned by 37% of sample and alcohol dependence was verified in 26.3% of participants. Regarding tobacco use, 27.7% had acquired this habit.

The DMFT index results found in the present study (mean value of 10) was lower than the results found for the population in the state of Santa Catarina for the age groups 35 to 44 years and 65 to 74 years (mean of 21.06 years) according to the Smiling Brazil Project (SB), Brazil 2010.

Thus, another study [6] pointed out that patients on HAART had less occurrence of decayed surfaces than those who were not treated with HAART. In fact, this is probably caused by patients' adherence to treatment, as they show more predisposition to receive dental and oral health care. Moreover, despite the results of the DMFT index in HIV patients showing a worse dental status than the general Brazilian mean DMFT based on the SB-Brazil 2010 project, 63.8% of those surveyed considered public health services to be satisfactory.

In other previous studies by [11,12], the DMFT index was observed to be higher than that obtained in the general Brazilian population by an earlier SB-Brazil Project (2003). On the other hand, the results shown in a systematic review [13], demonstrated a high

incidence of caries scores that were higher in the primary teeth of the HIV-infected patients, according to DMFT/DMFS index.

As regards the prevalence of xerostomia in patients before or after therapy, 50% of the patients had this clinical condition. While starting with HAART was associated with xerostomia, 52% of sample was affected. In a recent systematic review [14], their results showed highly divergent results relative to xerostomia, ranging from 2% to 76.2%. Thus, it has been associated the prolonged use of HAART with reduced salivary flow and the feeling of dry mouth. The pre-existence of xerostomia, or its appearance, has also been associated with the development of other oral lesions, such as ulcers, candidiasis, carious lesions and periodontitis. Furthermore, it was noted that other factors contributed to the etiology of xerostomia, such as smoking, hypertensive drugs, anxiolytic and antidepressant agents, the co-infection of origin and HAART; however, only therapy and lifestyle habits such as smoking were considered in this study [14].

The 35.7% prevalence of oral lesions in patients included in our study corroborated the results found by Patil., *et al*. [5], who found oral lesions in 32% of HAART and 56% of non-HAART patients, showing that the occurrence of these lesions were favored by immunosuppression seen in HIV patients. At intraoral examination, a case of extra-nodal lymphoma in the hard palate was observed. According to brief clinical opinion about lymphomas in HIV patients [15], non-Hodgkin's lymphomas are considered an AIDS-defining condition and at present, these represent the most common types of cancer in individuals with HIV infection. Indeed, a high viral load and lower CD4 counts are both risk factors for the development of non-Hodgkin's lymphomas. In our study, there was no significant association between lymphoma and CD4 lymphocyte account and viral load.

The present study showed a statistically significant association between pre-treatment patients and fungal, viral and bacterial lesions, relating the date of beginning with HAART to the type of oral lesion. Similar results have been obtained in a previous study [16], in which the distribution and comparison of oral lesions in individuals before undergoing HAART were described, showing that these were periodontal lesions (68.75%), followed by candidiasis (24.38%), hyperpigmentation (5.31%), aphtha ulcers (1, 25%) and herpes (0.31%).

Patil., *et al*. [5] in their clinical study conducted, they subdivided subjects into a group that used HAART and a Group that did not use this therapy. In patients with HAART, the CD4 cell account was higher and the prevalence of oral lesions was lower than the non-HAART group. However, in the former group there was an increase in hyperpigmentation (14%) compared with the group that did not use the therapy (10%). In our study, there was also a case of pigmentation associated with HAART, located on the lips, upper and lower lip mucosa, and bilateral buccal mucosa. Whereas, the data obtained were in agreement with those described previously [16], in which the occurrence of hyperpigmentation was higher 3 months later in patients who underwent HAART.

When comparing the CD4 counts with the presence of oral lesions, the results showed that 80% of the patients had a CD4 count higher than 200 cells/mm^3, and 20% had a CD4 count lower than 200 cells/mm^3. Relative to the viral load count and presence of lesions, 50% of the patients had an undetectable viral load, 20% had a viral load higher than 40 to 10,000 copies of RNA/ml and 30% had a viral load exceeding 10,000 - 30,000 copies of RNA/ml. Similar results were described in previous articles in the literature [8,17].

Moreover, the most common oral lesions found in common by Pakfetrat., *et al*. [8] were severe periodontitis (30%), pseudomembranous candidiasis (26%) and hairy tongue (26%). Patients between 26 - 35 years showed a higher prevalence of oral lesions, with no statistically significant difference in presence of lesions and gender. In contrast, our results showed that the prevalence of oral lesions in the male gender was 80%; the age group included was between 31 to 43 years old. Moreover, smoker patients showed a 30% prevalence of oral lesions.

The present study had limitations regarding the sample size obtained; this was probably associated with the adherence of the HIV positive patients to participating in this research, due to psychosocial parameters (such as fear, could been rejected or racist factors) that they attributed to their systemic condition. Furthermore, the lack of greater awareness in HIV positive patients with regard to the management and care of oral health was an inherent difficulty in this population, which restricted access to and collection of a larger amount of information.

Conclusion

The prevalence and incidence of oral lesions in the HIV- positive population was high due to several associated factors such as the host's compromised immune system, factors associated with treatment (HAART) and associated with the patients' life style. Although the DMFT index was low when compared with values in previous studies, it emphasized the importance of encouraging patients affected by HIV to take thorough care of their oral hygiene and instructing them how it must be performed. The fundamental role of general clinicians, stomatologists and oral medicine practitioners is relevant for the diagnosis and correct management of these lesions in patients with a weakened systemic condition. Conducting studies with a larger sample size and long-term follow-up are recommended to enable accurate assessment of systemic therapies and their impact on the oral cavity.

Acknowledgments

This work was supported by School of Dentistry, Community University of Chapeco Region (UNOCHAPECO) in association with the Specialized Care Services (SCS) in HIV/AIDS of Chapeco, Santa Catarina (SC)/Brazil.

Funding

The author Wilber E. Bernaola-Paredes is student fellow and supported with a scholarship provided by the National Council for Scientific and Technological Development of Brazil (CNPq), Sao Paulo, Brazil (Grant number: 140071/2019-9).

Conflict of Interest

There are no conflicts of interest to declare with regard to this article.

Ethical Approval

This study was submitted for ethical approval by the institution (Community University of Chapeco Region (UNOCHAPECO) with acceptance protocol number 2.621.909.

Bibliography

1. De Almeida VL, Lima IFP, Ziegelmann PK, et al. Impact of highly active antiretroviral therapy on the prevalence of oral lesions in HIV-positive patients: a systematic review and meta-analysis. Int J Oral Maxillofac Surg. 2017;46:1497-1504.
2. Navazesh M, Mulligan R, Barrón Y, et al. A 4-year longitudinal evaluation of xerostomia and salivary gland hypofunction in the Women's Interagency HIV Study participants. Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology. 2003;95:693-698.
3. Ortega KL, Vale DA, Magalhães MHCG. Impact of PI and NNRTI HAART-based therapy on oral lesions of Brazilian HIV-infected patients. J Oral Pathol Med. 2009;38:489-494.
4. Braz-Silva PH, Schussel JL, López Ortega K, Gallottini M. Oral lesions as an important marker for HIV progression. Dermatol Online J. 2017;23.
5. Patil N, Chaurasia VR, Babaji P, et al. The effect of highly active antiretroviral therapy on the prevalence of oral manifestation in human immunodeficiency virus-infected patients in Karnataka, India. Eur J Dent. 2015;9:47-52.
6. Soares GB, Garbin CAS, Moimaz SAS, Garbin AJÍ. Oral health status of people living with HIV/AIDS attending a specialized service in Brazil. Spec Care Dent. 2014;34:176-184.
7. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, STROBE Initiative. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. Lancet. 2007;370:1453-1457.
8. Pakfetrat A, Falaki F, Delavarian Z, et al. Oral manifestations of human immunodeficiency virus-infected patients. Iran J Otorhinolaryngol. 2015;27:43.
9. Gasparin AB, Ferreira FV, Danesi CC, et al. Prevalência e fatores associados às manifestações bucais em pacientes HIV positivos atendidos em cidade sul-brasileira. Cad Saude Publica. 2009;25:1307-1315.
10. De Quadros Coelho M, Cordeiro JM, Júnior E de SB, et al. Perfil de pessoas que vivem com HIV/Aids e prevalência de manifestações bucais nesses indivíduos. Unimontes Científica. 2015;16:28-37.
11. Souza AJ de, Gomes-Filho IS, Silva CAL da, et al. Factors associated with dental caries, periodontitis and intra-oral lesions in individuals with HIV/AIDS. AIDS Care. 2018;30:578-585.

12. Soares MSM, Gonçalves LFF, Macena MS de A, et al. Condição periodontal e dentária em pacientes HIV positivos. RGO-Rev Gaúcha Odontol. 2009;57:419-423.

13. Oliveira CAGR, Tannure PN, de Souza IPR, et al. Is dental caries experience increased in HIV-infected children and adolescents? A meta-analysis. Acta Odontol Scand. 2015;73:481-487.

14. Trezena S, Rodrigues AIS, Júnior E de SB, Pinto M de QC. Xerostomia em pacientes com HIV/Aids: revisão sistemática de literatura. Rev Da Fac Odontol. 2018;23.

15. Cesarman E. Pathology of lymphoma in HIV. Curr Opin Oncol. 2013;25:487.

16. Rao KVSE, Chitturi RT, Kattappagari KK, et al. Impact of highly active antiretroviral therapy on oral manifestations of patients with human immunodeficiency virus/acquired immuno deficiency syndrome in South India. Indian J Sex Transm Dis AIDS. 2015;36:35.

17. Gaitan LAC, Ceballos AS, López KO, et al. Oral lesions and immune reconstitution syndrome in HIV+/AIDS patients receiving highly active antiretroviral therapy. Epidemiological evidence. Med Oral Patol Oral Cir Bucal, 2008;13:E85-E93.

Volume 3 Issue 9 September 2020