



Relationship of Oral Lesions and CD4 Count in Female HIV Patients in South Western Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Oral lesions have been reported to be early clinical features of HIV infection.
Objective: The purpose of this study was to establish the prevalence of oral lesions in HIV Seropositive female patients and correlate the CD4 count with the appearance of oral lesions in the female patients attending Lagos University Teaching Hospital (LUTH) and University of Benin Teaching Hospital, Benin (UBTH).
Methods: A prospective study was undertaken in 172 newly diagnosed adult HIV infected female patients (not on antiretroviral therapy), who attended the PEPFAR clinic at LUTH and the HIV Clinic of the University of Benin Teaching Hospital, Benin City, Nigeria. They were assessed for oral lesions which were evaluated using EEC/WHO (2003) – Classification on the diagnostic criteria for oral lesions in HIV. Data were collected using an interviewer administered questionnaire. Following Oral examination undertaken, oral lesions were detected, recorded and

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treated. CD4+ values were evaluated from blood samples of patient at presentation.

Results: A total of 172 HIV infected female patients were enrolled into the study. The age range of the participants was 18-65 years, (mean age: 36 + 9.2 years). The commonest oral lesion observed was pseudomembranous candidiasis (n=42, 35.9%); followed by melanotic hyperpigmentation (n=14, 12%) and Linear gingival erythema (LGE) was 12 (10.3%) cases. A high prevalence of oral lesions was seen in patients with low CD4+ count (<200 cells/mm³). P value = .001.

Conclusion: Oral lesions are common features of HIV and were seen more in patients with low CD4 count.

Keywords: HIV; female; oral lesions; CD4 count.

1. INTRODUCTION

Human immunodeficiency virus- related oral lesions (HIV-ROL) have been reported to be early clinical features of HIV infection [1]. These lesions are often indicators of immune suppression and can be used for early testing, diagnosis and management of patients with HIV/AIDS. Oral lesions contribute to patients' morbidity, affecting the psychological and economic functioning of the individual and community [2].

Oral manifestations of HIV infection are a fundamental component of disease progression and occur in approximately 30 to 80% of the affected patient population [3,4]. Factors which predispose to expression of oral lesions include CD4 counts less than 200 cells/mm³, viral load greater than 3000 copies/mL, xerostomia, poor oral hygiene and smoking [5].

Several studies carried out in the various geopolitical regions of Nigeria have shown the high prevalence of oral lesions amongst infected patients. Onunu et al. [6] observed a prevalence of 48.8% of oral lesions in Benin City, Edo state, while Anteyi et al. [7] reported a prevalence of 53% in the northern part of the country. Seventy percent (70%) was obtained by Wright et al. [8] in Lagos (General hospital) and Arotiba et al. [9] recorded 45% in Ibadan, South West Nigeria. With many more studies carried out in various parts of the country, very few studies have been able to show the relationship of the CD4 count to the manifestation of oral lesions.

Considering the potential geographic and gender variability in the presentations of HIV related oral lesions, this study aimed to establish the prevalence of oral lesions in HIV Seropositive female patients and the correlation of CD4 count with the appearance of oral lesions.

2. MATERIALS AND METHODS

The prospective study was carried out at the Presidents Emergency Programme for AIDS Relief (PEPFAR) clinic, Lagos University Teaching Hospital (LUTH), Lagos State and the HIV Clinic of the University of Benin Teaching Hospital Benin City Nigeria. 172 newly diagnosed adult female HIV infected patients (not on antiretroviral therapy) were recruited and assessed for presence or absence of oral lesions. The lesions were evaluated using EEC-WHO- Classification on the diagnostic criteria for oral lesions in HIV after obtaining a written and verbal consent from the respondents.

2.1 Ethical Clearance

The study proposal was approved by LUTH and UBTH Ethics committees.

2.2 Data Collection

The patients were given Pre- and post-test counseling (i.e. before and after screening). Data were collected using an interviewer administered questionnaire which included demographic information, mode of transmission of disease, and HIV- related information: transmission possibilities, HIV status of spouse/partner, Medical and past dental history.

Oral examination was carried out using a bright light source and sterile disposable mouth mirrors. Oral tissues were examined for changes in size, colour and shape of anatomic areas as well as for clinical signs and lesions. Oral examination was done at presentation.

CD4 counts were investigated in the patients at presentation at the PEPFAR laboratory after phlebotomy, results were later retrieved and

recorded. This was classified according to CDC classification system into three groups as-

- Group A= 500 and above cell/mm³ (no immunosuppression)
- Group B= 201-499 cell/mm³ (moderate immunosuppression) and
- Group C= 0-200 cell/mm³ (severe immunosuppression).

The relationship between oral lesions and HIV was assessed.

2.3 Data Analysis

Data was analyzed using Epi info 2000 series for windows (Microsoft Corp). Chi- square statistical analysis of the strength of association between types of oral manifestations and the CD4 counts were carried out. *P* values = .05 were accepted as being statistically significant. All continuous variables were reported as mean values plus or minus Standard Deviation (SD). Categorical variables were reported using tables and figures. Frequency tables were generated for nominal and ordinal variables.

3. RESULTS

The age range of the 172 female patients who enrolled in this study was 18-65 years, the peak age group was 26-30 years (n=44, 25.6%) and the mean age was 36±9.2 years. Most of the patients were married (n=88, 51.2%), followed by singles (n=47, 27.3%). Majority of the subjects had primary and secondary levels of education (77.4%).

From the 172 HIV positive subjects examined at presentation, 76 (44.2%) had at least one oral lesions. 29 (38.2%) respondents had multiple oral lesions, with 4 being the maximum number noticed per patient. The commonest oral lesion observed was pseudomembranous candidiasis (n=42, 35.9%), followed by melanotic hyperpigmentation (n=14, 12.0%) and Linear gingival erythema accounted for 12 (10.3%) cases. Other lesions seen were xerostomia (n=11, 9.4%), angular cheilitis (n=8, 6.8%), erythematous Candidiasis (n=8, 6.8%) and hairy Leukoplakia (n=4, 3.4%). Other lesions rarely seen were shown in Table 1.

Table 1. Prevalence of specific oral lesions seen in 172 HIV positive women based on EC/WHO 1993 classification of Oral lesions associated with HIV/AIDS

Oral lesions	Frequency	
	N	%
Patients with at least one oral lesion	76	44.2
Without any lesion	96	55.8
Group 1 lesions		
• Candidiasis:		
Erythematous	8	6.8
Pseudomembranous	42	35.9
Angular cheilitis	8	6.8
• Periodontal diseases:		
Linear gingival erythema	12	10.3
Necrotizing ulcerative gingivitis	1	0.9
Necrotizing ulcerative periodontitis	1	0.9
Hairy leukoplakia	4	3.4
Kaposi's sarcoma	1	0.9
Cervical lymphadenopathy	2	1.7
Total	79	67.5
Group 2 lesions		
Melanotic hyperpigmentation	14	12.0
Xerostomia	11	9.4
Salivary gland swelling	2	1.7
Thrombocytopenic purpura	1	0.9
Ulceration NOS (not otherwise specific)	3	2.5
Herpes Zoster	2	1.7
Total	33	28.2
Group 3 lesions		
Facial palsy	1	0.9
Recurrent aphthous ulcer	4	3.4
Total	5	4.3
Total no of lesions seen	117	100

The distribution of oral lesions based on the CD4+ count of the HIV infected patients at presentation showed that most of the oral lesions at baseline (n=70, 54.7%) occurred at CD4+ count < 200 cells/ml; about 50 (39.0%) oral lesions were seen at CD4+ count of 200 – 499 cells/ml, while 8 (6.3%) cases of oral lesions were seen at CD4+ count ≥ 500 cells/ml. Mean CD4 count in patients with oral lesions was 213.3 cells/mm³. Chi-square test revealed statistically significant association between the presence of oral lesions and CD4+ count in HIV infected women (*P*= .001) Table 2.

Table 2. Distribution of HIV/AIDS oral lesions based on CD4+ count in HIV positive women

Time (months)	Number of oral lesions based on CD4+ count/ml			Mean CD4 (cells/ml)	P value
	<200	200 -499	≥500		
0	70	50	8	213.3	.001*
3	21	14	6	306.9	.036*

* P value is statistically significant

4. DISCUSSION

HIV-related oral lesions can be used as markers of the immune status of infected patients [10]. It has been established from various published reports that most HIV infected patients will present with varying form of oral lesions during the course of the disease [11,12,13,14]. The CD4 count and viral load measures the progression of the HIV disease. The mean CD4 count in patients with oral lesions in this study was 213.3 cells/mm³. This was comparable to a study that recorded a mean CD4 count of 207 cells/mm³ in HIV patients with oral lesions [10] and, thus indicates a likelihood of increased oral lesions with deterioration of the immune system.

Observation in this series that oral candidiasis (49.5%), melanotic hyperpigmentation (12.0%) linear gingival erythema (10.3%) and oral hairy leukoplakia (3.4%) were more prevalent in CD4 count group < 200 cell/mm³ suggests that there is a positive association between presence of oral lesions and degree of immunosuppression as indicated by low CD4 count. These findings are consistent with a similar work on HIV infected women which gave the odds ratio (OR) for the association between oral lesions and CD4 cell counts as 8.9 indicating a strong positive association with the level of immunosuppression [12].

Adurogbangba et al. [15] observed an increase in oral lesions particularly oral Candidiasis in HIV patients with low CD4 count in Ibadan, South west Nigeria. Also, reports from other parts of the world have demonstrated increased prevalence of oral lesions with increased risk of progression of HIV disease [16]. The majority of longitudinal studies done have demonstrated an association between presence of oral candidiasis and oral hairy leukoplakia, and a decreased CD4 lymphocyte count in HIV- infected adults subjects [17,18,19,20]. Greenspan et al. [21] showed disease progression characterised by an increased prevalence of Oral Candidiasis, Oral Hairy Leukoplakia, Necrotising ulcerative

Periodontitis (NUP) and xerostomia. Several other studies have also supported these findings [22,23,24,25,26].

Oral candidiasis was the most common oral lesion seen in the present study. A study that also reported oral candidiasis as the most common oral lesion associated with HIV found that a CD4 count less than 200 cells/mm³ or the presence of oral candidiasis at the time of data collection increased the risk of death or development of AIDS and such prognosis was worse if both the factors were present at the onset of evaluation. This relationship between oral candidiasis and low CD4 lymphocyte counts suggests that the presence of oral candidiasis is an indirect marker of immune status of an HIV-infected patient when a CD4 count is unavailable [27]. This is also consistent with findings by Gonçalves et al. [28]. Both oral candidiasis and oral leukoplakia have been accepted to be of value in staging and classification schemes for HIV disease [19,24,29,30,31]. In addition to their role in the diagnosis of HIV infection and as indicators of the progress of HIV disease, they are also used as clinical correlates of CD4 counts [29]. This association of oral lesions with low CD4 count could serve as markers for immunosuppression and in identifying progression of HIV infection, particularly where CD4 count and viral load cannot be determined routinely.

5. CONCLUSION

Oral lesions were more prevalent in highly immunocompromised patients with low CD4 count < 200 cells/mm³ and could therefore serve as positive indicators of declining immune status in HIV infected patients.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Greenspan JS, Barr CE, Sciubba JJ, Winkler JR. Oral manifestations of HIV infection. *Oral Surg Oral Med Oral Pathol.* 1992;73:142-144.
2. Kaminu HN, Naidoo S. Oral HIV lesions and oral health behavior of HIV- Positive patients attending the Queen Elizabeth II Hospital. *SADJ.* 2002;57:479.
3. Palmer GD, Robinson PG, Challacombe SJ, Birnbaum W, Croser D, Erridge PL, et al. Aetiological factors for oral manifestation of HIV infection. *Oral Dis.* 1996;2:193-197.
4. Reznik D.A. Perspective- Oral Manifestation of HIV disease. *Top HIV Med.* 2005;13(5):143-148.
5. Greenspan D, Komaroff E, Redford M, Phelan JA, Navashesh M, Alves ME, Kamarath H, et al. Oral mucosal lesions and HIV viral load in womens' interagency HIV study (WIHS). *J AIDS.* 2001;27(1):96-97.
6. Onunu AN, Obueke N. HIV- related oral diseases in Benin City, Nigeria. *West Afr J Med.* 2002;21:9-11.
7. Anteyi KO, Thacher TD, Yohanna S, Idoko JI. Oral manifestation of HIV/ AIDS in Nigerian patients. *Int. J. AIDS.* 2003;14: 395-398.
8. Wright AA, Agbelusi GA. Group II and III lesions in HIV positive Nigerians attending the general Hospital Lagos, Nigeria. *Odonto- Stomatologie Tropicale.* 2005; 112:19-23.
9. Arotiba JT, Arowojolu MO, Fasola AO, Denloye OO, Obiechina AE. Oral manifestation of HIV/AIDS. *Afr J Med Med Sci.* 2006;35:13-18.
10. Bodhade AS, Ganvir SM, Hazarey VK. Oral manifestations of HIV infection and their correlation with CD4 count. *J. Oral Sci.* 2011;53(2):203-211
11. Tukutuku K, Muyembe-Tamfum L, Kayembe K. Oral manifestation of AIDS in a heterosexual population in a Zaire hospital. *J Oral Pathol Med.* 1990;19:232-234.
12. Shiboski CH, Hilton JF, Greenspan D, Westenhause JL, Derish P, et al. HIV – related oral manifestation in two cohorts of Women in San Francisco. *J. AIDS.* 1994;7:964-71.
13. Hodgson TA. HIV-associated oral lesions: Prevalence in Zambia. *Oral Dis.* 1997;3(1): S46-S50.
14. Eweka OM, Agbelusi GA, Odukoya O. Prevalence of oral lesions and the effects of HAART in adult HIV patients attending a tertiary hospital in Lagos, Nigeria. *OJST.* 2012;2:200-205.
15. Adurogbangba MI, Aderinokun GA, Odaibo GN, Olaleye OD, Lawoyin TO. Oro-facial lesions and CD4 counts in an adult population in Oyo state, Nigeria. *Oral Dis.* 2004;10:319-326.
16. Hodgson TA, Greenspan D, Greenspan JS. Oral lesions of HIV diseases and HAART in industrialized countries. *Adv. Dent. Res.* 2006;19:57-62.
17. Rabeneck L, Hartigan PM, Huang IW, Soucek J, Wray NP. Predicting outcomes in HIV-infected veterans: II. Survival after AIDS. *J Clin Epidemiol.* 1997;50:1241-1248.
18. Munoz-Perez MA, Rodriguez-Pichardo A, Camacho F, Colmenero MA. Dermatological findings correlated with CD4 lymphocyte counts in a prospective 3 year study of 1161 patients with human immunodeficiency virus disease predominantly acquired through intravenous drug abuse. *Br J Dermatol.* 1998;139:33-39.
19. Margiotta V, Campisi G, Mancuso S, Accurso V, Abbadesa V. HIV infection: oral lesions, CD4 cell count, and viral load in an Italian study population. *J. Oral Pathol Med.* 1999;28:173-177.
20. Ramírez-Amador V, Esquivel-Pedraza L, Sierra-Madero J, Anaya-Saavedra G, Gonzalez-Ramírez I, Ponce-de-Leon S. The changing clinical spectrum of human immunodeficiency virus (HIV)-related oral lesions in 1,000 consecutive patients: a 12-year study in a referral center in Mexico. *Medicine (Balt).* 2003;82:39-50.
21. Greenspan D, Greenspan JS. HIV- related oral disease. *The Lancet.* 1996;348:729-733.
22. Glick M, Muzyka BC, Lurie D, Salkin LM. Necrotising Ulcerative Periodontitis: a marker for immune deterioration and a predictor for the diagnosis of AIDS. *J. Periodontol.* 1994;65:393-397.
23. Lifson AR, Hilton JF, Westenhause JL. Time from HIV seroconversion to oral candidiasis or Hairy Leukoplakia among homosexual and Bisexual men enrolled in three prospective cohorts. *AIDS.* 1994;8:73-79.
24. Begg MD, Lamster IB, Panageas KS, Mitchell-Lewis D, Phelan JA, Grbic JT. A

- prospective study of oral lesions and their predictive value for progression of HIV disease. *Oral Dis.* 1997;3:176-183.
25. Hilton JF, Donegan E, Katz MH, Canchola AJ, Fusaro RE, Greenspan D, et al. Development of oral lesions in human immunodeficiency virus-infected transfusion recipients and hemophiliacs. *Am J Epidemiol.* 1997;145:164-174.
 26. Shiboski CH, Neuhaus JM, Greenspan D, Greenspan JS. Effect of receptive oral sex and smoking on the incidence of hairy leukoplakia in HIV-positive gay men. *J. AIDS.* 1999;21:236-242.
 27. Sontakke SA, Umarji HR, Karjodkar F. Comparison of oral manifestations with CD4 count in HIV-infected patients. *Indian J Dent Res.* 2011;22:732-33.
 28. Gonçalves LS, Silva A, Ferreira SM, Sousa CO, Fontes TV, Vettore MV, et al. Factors associated with specific clinical forms of oral candidiasis in HIV-infected Brazilian adults. *Arch of oral Biol.* 2013;58(6):657-663.
 29. Greenspan JS. Sentinels and signposts: The Epidemiology and significance of the oral manifestations of HIV disease. *Oral Dis.* 1997;J:s13-7.
 30. Gebic JT, Lamster IB. Oral manifestations of HIV infection. *AIDS Patients Care STDS.* 1997;11:18-24.
 31. Taiwo OO, Hassan Z. HIV-related oral lesions as markers of immunosuppression in HIV sero-positive Nigerian patients. *J. Med. Med. Sci.* 2010;1:166-17.

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