



# Head and neck lesions among HIV/AIDS patients on highly active antiretroviral therapy attending the Muhimbili National Hospital in Dar es Salaam, Tanzania

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**Background:** Head and neck (H&N) lesions in HIV/AIDS can involve the skin and upper aero-digestive tract, therefore, they may not only indicate HIV infection but also may be among the early clinical features and can predict the progression of HIV disease to AIDS. However, with introduction highly active antiretroviral therapy (HAART) there has been a global reduction in H&N lesions. This study aimed to determine the incidence of H&N lesions among HIV/AIDS patients on HAART attending the Muhimbili National Hospital (MNH).

**Methods:** This was a cross-sectional hospital-based study which was carried at the HIV clinic of the MNH in 2015/2016. Through convenient sampling technique, 346 patients were recruited in the study. A pre-designed questionnaire was used to obtain socio-demographic data and duration since when the patients were diagnosed with HIV/AIDS. Physical examination and laboratory investigations (histology and CD4 counts) were conducted. Data obtained were analyzed using Statistical Package for Social Sciences program version 23.

**Results:** Of the total number of patients included in the study, 55 (15.9%) had H&N lesions. There were more females (78.2%) with the male to female ratio of 1:3.6. Mean age of the patients was 38.27±1.74 years. About 36.4% (n=20) of the patients with H&N lesions were diagnosed with HIV/AIDS within 2 years. The majority had CD4 counts of ≤200 cells/μL. Oral candidiasis, head and neck squamous cell carcinoma (HNSCC), Kaposi's sarcoma (KS) and non-Hodgkin's lymphoma (NHL) were the common lesions encountered.

**Conclusions:** The incidence of H&N lesions in patients with HIV/AIDS on HAART was low. Oral candidiasis was the most common infection and HNSCC was the leading malignant H&N lesion in this group of patients. Most of the patients with H&N lesions had CD4 levels <200 cells/μL.

**Keywords:** Head and neck (H&N) lesions; HIV/AIDS; highly active antiretroviral therapy (HAART); Tanzania

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## Introduction

HIV infection and AIDS have remained challenging public health concerns globally. According to 2017 UNAIDS data it was estimated that nearly 37 million people in the world were living with HIV infection and the rate of new infections per day was around 5,000 people (1). In Tanzania, it was estimated that about 1.5 million people were living with HIV infection and annually there were about 65,000 new infections (1).

HIV targets the CD<sub>4</sub> T lymphocyte population and progressively causes its depletion, leading to the deterioration of the immune status of the body (2). This leaves the victim vulnerable to a spectrum of disease conditions associated with the primary infection including life-threatening opportunistic infections, neurologic disorders and malignancies (2,3).

Due to the compromised immune system, different manifestations of HIV/AIDS may be apparent in the body, including the head and neck (H&N) region. H&N manifestations of HIV/AIDS often involve the skin and upper aero-digestive tract, (3). Nearly 50% of HIV-positive patients and about 80% of those with a diagnosis of AIDS reportedly display different types of oral lesions in isolation or in combination (4,5). H&N lesions may not only indicate HIV infection but also may be among the early clinical features and can predict the progression of HIV disease to AIDS (4). Regarding infection, oral candidiasis is the most common oral manifestation of AIDS with a prevalence of more than 70% (3) among all malignancies, Kaposi's sarcoma (KS) and non-Hodgkin's lymphoma (NHL) have been classified as AIDS-related malignancies (3,6). However, with the introduction of highly active antiretroviral therapy (HAART) there has been a global reduction in H&N lesions in both adults and children (7).

So far, H&N lesions among Tanzanian patients with HIV/AIDS on HAART have not yet been adequately studied. Therefore, this study aimed at determining the incidence of H&N lesions among HIV/AIDS patients on HAART attending the HIV/AIDS clinic at the Muhimbili National Hospital (MNH).

## Methods

This cross-sectional study was conducted in MNH for seven months from June 2015 to January 2016. A convenience sampling technique was applied whereby all patients living with HIV infection who attended the MNH-

HIV clinic during the study period were included after they had consented. All the patients were on HAART which was combination of 3 drugs (Tenofovir, Lamivudine, and Efavirenz).

All patients included in the study were interviewed using a pre-designed questionnaire to obtain socio-demographic data (sex, age, marital status, occupation and level of education) and duration since they were diagnosed with HIV/AIDS. During physical examination, lesions that were suspected to be benign/malignant tumours, were subjected to histological/cytological investigations. The CD4 cell count evaluation was done and all results were recorded in a special form.

All questionnaires were checked by the investigator for completion. Data was then entered, cleaned and analysed using Statistical Package for Social Sciences (SPSS) version 23.0. For descriptive analysis, age was grouped in a range of 20 years and the occupation was dichotomized to those with unstable income (e.g., petty traders, peasants, students, etc.) and stable income (e.g., civil servants, business persons). Marital status was dichotomized to those with partners (married and cohabiting) and those without partners (single, widow/widower and divorced).

The duration since the patient was diagnosed with HIV/AIDS up to the time of the study was dichotomized to less than 2 years or more than 2 years. To facilitate logistic regression analysis, age was dichotomized to less or equal to 35 years and more than 35 years, and CD<sub>4</sub> counts were dichotomized as equal or less than 200 cells/ $\mu$ L and more than 200 cells/ $\mu$ L.

Categorical variables were expressed as frequencies and proportions and continuous variables as means and standard error of mean. Chi-square test was used to ascertain association between independent factors and dependent factors (occurrence of H&N lesions). The crude odds ratio was calculated for all study variables followed by a multivariate logistic regression model (which included variables with P value <0.15 in the bivariate analysis) to compute adjusted odds ratios, for determining independent risk factors for occurrence of H&N lesions among patients diagnosed with HIV/AIDS.

The study was approved by the Research and Ethics Committee of the Muhimbili University of Health and Allied Sciences (MUHAS) and permission was granted by MNH. Participation was voluntary, and for each participant a signed informed consent form was obtained before data collection. The participants were assured of confidentiality and their right to participate or withdraw without any

**Table 1** Distribution of study participants according to demographic characteristics

Variable	Total study population (N=346) (%)	Population sample with H&N lesions (N=55) (%)
Age group (years)		
0–19	8 (2.3)	6 (10.9)
20–39	101 (29.2)	20 (36.4)
40–59	219 (63.3)	28 (50.9)
60+	18 (5.2)	1 (1.8)
Sex		
Male	100 (28.9)	12 (21.8)
Female	246 (71.1)	43 (78.2)
Marital Status		
Without partner	157 (45.4)	30 (54.5)
With partner	189 (54.6)	25 (45.5)
Income		
Unstable	263 (76.0)	40 (72.7)
Stable	83 (24.0)	15 (27.3)
Duration since diagnosed with HIV/AIDS (years)		
≤2	82 (23.7)	20 (36.4)
>2	264 (76.3)	35 (63.6)

conditions. No names were used to avoid identification. Participants who were found to have H&N lesions were treated according to the established protocol in MNH.

## Results

There was a total of 346 patients with more females (n=246, 71.1%) than males with a male to female ratio of 1:2.5. The age range was between 1 and 69 years with a mean age of 43.31±0.55 years. Over 92.5% (n=320) of the patients were aged between 20 and 59 years. Many (n=263, 76.0%) patients had unstable income and slightly more (n=189, 54.6%) than half of them had at least a partner. About 76.3% (n=264) were diagnosed with HIV/AIDS for more than 2 years (Table 1). One hundred and forty-two (41.0%) patients had CD<sub>4</sub> counts of less than 200 cells/μL.

Fifty-five (15.9%) patients had (H&N) lesions. Among these there were more females (n=43, 78.2%) than males with a male to female ratio of 1:3.6. The age range of these

patients was between 1 and 64 years with the mean age of 38.27±1.74 years. Forty-eight (87.3%) of the patients with H&N lesions were aged 20 to 59 years. Twenty (36.4%) of the patients with H&N lesions had been diagnosed with HIV/AIDS within 2 years. (Table 1). Thirty-six (65.5%) had CD<sub>4</sub> counts of less than 200 cells/μL.

There were 23 (41.8%) patients with malignant conditions, 19 (34.5%) with infections, 9 (16.4%) with inflammatory conditions and 4 (7.3%) with benign lesions (Table 2). Seventy-eight percent of oral candidiasis, 83.3% of NHL and all KS (100%) occurred in patients whose CD<sub>4</sub> count were less than 200 cells/μL. Only 37.5% of patients who had CD<sub>4</sub> count less than 200 cells/μL were found to have head and neck squamous cell carcinoma (HNSCC).

The occurrence of H&N lesion in HIV patients was significantly associated with the age of patients, duration since the patient was diagnosed with HIV/AIDS and CD<sub>4</sub> count of the patient (Table 3). The results of logistic regression analysis have been presented in Table 4.

## Discussion

In this study, most of the patients were females, similar to what was reported in some studies (8,9), but contrary to other reports from elsewhere (10-12). The mean age of the patients was 43 years which was higher than what was reported in Iran (3) and Kenya (13).

In the current study, about 16% of patients with HIV/AIDS had lesions in the H&N region. These findings were lower than what was reported elsewhere (13,14). The low incidence in this study may be attributed to the use of HAART in this group of patients, which tends to decrease the plasma levels of HIV RNA (viral load) and increase the peripheral CD<sub>4</sub> count (12,15). Moreover, it also reduces the incidence of opportunistic infections, including odontogenic infections and malignancies, especially AIDS-defining cancers (12).

In the current study, more than 60% of patients with H&N lesions had considerably low CD<sub>4</sub> counts (less than 200 cells/μL) and were 3 times more susceptible to develop H&N lesions. Patients with such low CD<sub>4</sub> counts are considered to be severely immune-compromised and the risk and severity of opportunistic infections and malignancies increases (2,3,16).

In congruency to findings in the literature (4,10), the commonest lesion noted in this study was oral candidiasis, with seventy-eight percent observed in patients with CD<sub>4</sub> counts of <200 cells/μL. Oral candidiasis (Figure 1) is one

**Table 2** Head and neck lesions in HIV/AIDS patients on HAART

Category of Condition	Specific diagnosis	Frequency (n)	Percentage (%)
Malignant lesions	Oro-pharyngeal Squamous cell carcinoma	8	14.5
	Non-Hodgkins' Lymphoma	6	10.9
	Kaposi's' Sarcoma	6	10.9
	Mucoepidermoid carcinoma	2	3.6
	Fibrosarcoma	1	1.8
Infectious processes	Oral candidiasis	14	25.5
	Osteomyelitis of the jaw	3	5.5
	Odontogenic abscess	2	3.6
Inflammatory conditions	Cervicofacial lymphadenitis	5	9.1
	Aphthous ulcers	2	3.6
	Sialoadenitis-submandibular gland	1	1.8
	Post Herpetic Neuralgia	1	1.8
Benign lesions	Ranula	2	3.6
	Lipoma	1	1.8
	Ossifying fibroma	1	1.8

HAART, highly active antiretroviral therapy.

of the most common opportunistic diseases associated with HIV infection whose manifestations are related to the immunosuppression (5). Some authors have thus suggested that in areas where CD<sub>4</sub> count monitoring may not be possible, oral candidiasis may be used as a secondary indicator of the immune status of an HIV-infected individual (8).

Contrary to what was reported elsewhere (17), in this study HNSCC (*Figure 2*) was the most common H&N malignancy. Although not an AIDS-defining illness, HNSCC is seen in excess among HIV-infected individuals (18). There may be a role played by human papillomavirus (HPV) in causing HNSCC since its prevalence is increased in HIV/AIDS (19). However, some studies have reported that the proportion of HPV-associated HNSCC in HIV-infected individuals did was low (20).

It has been reported that oral, craniofacial and cutaneous manifestations of AIDS-related KS (*Figure 3*) are relatively common, occurring in around 20% of patients affected by the disease (4,21). This is contrary to the findings of this study whereby the incidence of KS was relatively low. The low incidence of KS in this study may be attributed to

use of HAART, as randomized clinical trials have shown a protective effect of HAART against the development of KS, even in patients with a relatively low immune system (22).

The findings of this study show that more than 80% of NHL cases were noted in patients with low CD<sub>4</sub> counts. Apart from KS, NHL has a strong correlation with HIV infection thus is also described as AIDS-defining condition (3). Generally, the incidence of NHL, in this study was relatively low compared to what was reported elsewhere (17), and this may be again attributed to the use of HAART. In a systemic review done by Cobucci *et al.* it was found that there was a protective role of HAART (RR 0.52, 95% CI: 0.48–0.56) against developing NHL, which was directly related to the increased CD<sub>4</sub> count (23).

This study had few limitations, among them being a single-institution study. This calls for a multicenter case-control study. Despite this limitation, this study casts light on the existing situation in Tanzania and provides the clinicians and other health care workers valuable information regarding the incidence and types of H&N lesions that may be commonly encountered in HIV/AIDS patients.

**Table 3** The association between occurrence of head and neck lesions in patients with HIV/AIDS and different associated factors

Associated factors	Occurrence of H&N lesion in patients with HIV/AIDS		p-value
	No (n=291) (%)	Yes (n=55) (%)	
<b>Age group (years)</b>			
0–19	2 (25.0)	6 (75.0)	0.000
20–39	81 (80.2)	20 (19.8)	
40–59	191(87.2)	28 (12.8)	
60+	17 (94.4)	1 (5.6)	
<b>Sex</b>			
Male	88 (88.0)	12 (12.0)	0.134
Female	203 (82.5)	43 (17.5)	
<b>Marital status</b>			
Without a partner	127 (80.9)	30 (19.1)	0.090
With a partner	164 (86.8)	25 (13.2)	
<b>Income</b>			
Unstable	223 (84.8)	40 (15.2)	0.321
Stable	68 (81.9)	15 (18.1)	
<b>Duration since diagnosed with HIV/AIDS (years)</b>			
≤2	62 (75.6)	20 (24.4)	0.015
>2	229 (86.7)	35 (13.3)	
<b>CD<sub>4</sub> counts (cells/μL)</b>			
≤200	106 (74.6)	36 (25.4)	0.000
201–499	106 (88.3)	14 (11.7)	
≥500	79 (94.0)	5 (6.0)	

H&amp;N, head and neck.

## Conclusions

The incidence of H&N lesions in patients with HIV/AIDS on HAART was low. The majority of individuals were in the 3<sup>rd</sup> to 5<sup>th</sup> decade of life with a female predominance. Oral candidiasis was the most common infection and HNSCC was the leading malignant H&N lesion in this group of patients. Most of the patients with H&N lesions had CD<sub>4</sub> levels below 200 cells/μL.

**Table 4** Crude and adjusted odds ratio for the factors associated with the occurrence of H&N lesions in HIV/AIDS patients on HAART

Associated factors	Odds ratio (OR, 95% CI)	
	Crude OR	Adjusted OR
<b>Age group (years)</b>		
≤35	2.7 (1.46–5.03)	2.3 (1.17–4.47)
>35	1	1
<b>Sex</b>		
Male	1	1
Female	1.5 (0.78–3.09)	1.5 (0.73–3.15)
<b>Marital Status</b>		
Without a partner	1.5 (0.87–2.77)	1.5 (0.83–2.82)
With a partner	1	1
<b>Duration since diagnosed with HIV/AIDS (years)</b>		
≤2	2.1 (1.14–3.91)	1.7 (0.89–3.25)
>2	1	1
<b>CD<sub>4</sub> counts (cells/μL)</b>		
≤200	3.3 (1.81–6.06)	2.7 (1.44–5.16)
>200	1	1

HAART, highly active antiretroviral therapy.

**Figure 1** Oral Candidiasis. White plaques involving the dorsum of the tongue and right buccal mucosa in a patient with AIDS.



**Figure 2** An aggressive form of HNSCC with metastasis to a supraclavicular node (black arrow) in a young man with AIDS. HNSCC, head and neck squamous cell carcinoma.



**Figure 3** Kaposi sarcoma involving the entire palate in a patient with AIDS.

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## Footnote

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <https://fomm.amegroups.com/article/view/10.21037/fomm.2019.12.01/coif>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki

(as revised in 2013). The ethical clearance for this study was sought from the Research and Ethics Committee of the Muhimbili University of Health and Allied Sciences (MUHAS) and permission was granted by Muhimbili National Hospital and informed consent was taken from all individual participants.

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