Prevalence of Oral Lesions among HIV-Positive Patients in Ijebu Ode

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ABSTRACT

Oral lesions are prevalent in HIV positive individuals and serve as important markers of immune depression and progression of disease. The study was carried out at the General Hospital Ijebu-Ode, Nigeria with the aim of evaluating the prevalence of oral lesions, relationship of oral lesions with immune status and antiretroviral therapy (ART) adherence, risk factors in 76 HIV positive patients enrolled into study. Descriptive study design was adopted, retrospective examination of patients records and clinical examinations were performed. The study results revealed that 90.8% of the patients studied stated that they had had recurrent oral lesions, while 94.8% gave a positive response on being confirmed by experts' diagnosis. These lesions affect the quality of life of the patients suffering from it. (Talking and Mastication, 85.4%). Oral candida and periodontal diseases were found to be the most prevalent oral lesions which correlate with the low CD4 cell counts ($\chi^2 = 42.64$) and $p = 0.0002$, with the recurrent oral lesions found in the 53.95% of Disease patients with CD4 cell count of 200-350 cells/mm^3. Strict compliance with anti-retroviral therapy (ART) regimen (77.63%) application is found to reduce the prevalence of oral lesions in study population (χ^2= 125.74, $p = 0.005$). However, 19.74% of patients expressed broken adherence to anti-retroviral therapy regimen. Risk factors determining the presence of oral lesions in study population include: (91.9%) poor oral hygiene, (92.1%) smoking or alcoholics use, (71.1%) diet, (71.1%) stress and (90.8%) co-infections. However good oral hygiene practices exist amongst the patients (50%) brushing their teeth regularly twice a day, this is however found to be inadequate. The high burden of oral lesions among HIV Aids patients in settings with limited resources is also reiterated. There is therefore the need for integrated oral health care management among HIV positive patients. Regular dental examinations is therefore recommended to be done. Anti-retroviral therapy support compliance encouragement through counseling, counselling and Reminders is additionally proposed to enhance adherence among the patients. Community emphasis on better knowledge education and oral hygiene application improvement is vital for solving the factors of life style which present risk factors. Therefore, it is necessary for Synergy and Collaboration in the areas of managing at the various levels involving HIV specialists, dentists and nutritionists towards reducing incidence of oral lesions and improving health care outcomes in this population in study.

INTRODUCTION

Oral lesions are common clinical manifestations in patients living with Human Immunodeficiency Virus (HIV) and may serve as important clinical markers of immune suppression and the natural history of the disease (Patton et al. 2021). These lesions, e.g. candidiasis, hairy leukoplakia, Kaposi's sarcoma and necrotizing ulcerative gingivitis, may have a considerable negative effect on the quality of life of the individual patient, causing these patients to suffer from pain, difficulties in swallowing, and thereby also from increased predisposition to the development of opportunistic infections (Shiboski et al. 2020). Oral lesions usually are related to the level of CD4 cells and are commonly used as an early marker for diagnosis of HIV/AIDS, particularly in resource poor environments where sophisticated laboratory studies may not be readily available (Mugenza et al. 2022).

Although, globally there are many advances with respect to the treatment of HIV and the administration of antiretroviral therapy (ART) oral lesions continue to present a significant concern for those living with HIV/AIDS; particularly in countries that have less access to health care and lower awareness levels about

HIV/AIDS, as is the case in Nigeria (Adebola et al., 2019). The prevalence and extent of oral pathology can be affected by variables including antiretroviral therapy adherence, nutritional status, socio-economic status and presence of other infections including tuberculosis and hepatitis (Okeke et al., 2021).

The Human Immunodeficiency Virus (HIV) is an international public health concern that affects millions of people around the world. The World Health Organization (WHO) states in their 2023 report that there were over 39 million people who lived with HIV at the end of 2022; with Sub Saharan Africa being the hardest hit by the disease. Individuals with HIV have weakened immune systems and therefore are more likely to be exposed to opportunistic infections and/or additional diseases and conditions which include oral lesions. Oral lesions are among one of the first and most frequent signs or symptoms of HIV, and they may serve as key indicators of disease progression and immune function (Patton et al., 2022). Oral lesions may result in considerable pain, distress and/or functional impairment for patients, all of which may significantly impact on patients' overall quality of life and their ability to consume nutritious food (Coogan et al., 2021).

Evidence has shown that up to 80% of people infected with HIV will exhibit at least one oral sign during the course of their disease (Ranganathan et al., 2014). Common oral ulcers associated with HIV are oral candidiasis, oral hairy leukoplakia, Kaposi sarcoma, periodontal disease, and aphthous ulcers (Greenspan & Greenspan, 2022). Oral candidiasis (particularly the pseudomembranous type) is the most common ulcer reported and is often a marker of immunocompromise (Ramírez-Amador et al., 2023). Likewise, oral hairy leukoplakia (from the Epstein-Barr virus) is highly related to decreasing CD4+ T-cell counts and is considered a predictor of disease progress (Greenberg et al., 2017).

HIV-positive patients have a wide range of oral lesions based upon their individual and geographical status. Geographic area, the availability of antiretroviral therapy (ART) and the patient's immune status are some of the many variables which can impact the prevalence and type of oral lesions. In sub-saharan Africa, the prevalence of oral lesions may be higher than in other parts of the world because there is less access to healthcare and/or ART available to patients. A Nigerian study found that approximately 72.5% of HIV-positive patients had at least one oral lesion with oral candidiasis being the most common oral lesion found (Adeyemi et al., 2022). In addition, a South African study reported an estimated 68% prevalence of oral lesions in HIV-positive patients with oral candidiasis and periodontal disease being the most commonly identified oral lesions (Naidoo & Chikte, 2014). The introduction of ART has led to a significant decrease in both the incidence and severity of oral lesions in HIV-positive patients. By improving the immune system of patients with HIV/AIDS, ART has resulted in a reduction in the number of opportunistic infections and their respective oral manifestations (Tappuni & Fleming, 2021). Despite the availability of ART, a subset of patients will continue to develop oral lesions secondary to issues such as non-adherence to ART, drug resistance or IRIS (Patton et al., 2022). Additionally, the development of oral lesions in patients receiving ART supports the necessity of routine oral health assessments and the incorporation of HIV/AIDS care into dental practices.

While oral lesions are quite common in HIV patients, the knowledge and importance of oral health in HIV care programs is scarce, particularly in countries with limited resources. Much emphasis is placed on managing the systemic effects of HIV and not the oral health needs of patients (Naidoo & Chikte, 2014). This approach contributes to late diagnosis and treatment of oral lesions leading to more suffering in patients, in addition to complications in their health. There is therefore, a need to improve the emphasis on oral health and importance in HIV care. This is particularly pertinent in areas where there are high levels of HIV infections. The present study will access the prevalence of oral lesions in HIV positive patients, their relationship to immune status and ART adherence and also provide recommendations for improved oral health services for HIV patients in General Hospital, Ijebu- Ode.

Objectives

1. To determine the prevalence of oral lesions among HIV-positive patients.
2. To assess the relationship between immune status and the occurrence of oral lesions in patients with HIV.
3. To evaluate the impact of antiretroviral therapy (ART) adherence on the occurrence of oral lesions.
4. To identify the risk factors associated with oral lesions in HIV patients.

1.4 Research Questions

1. What is the prevalence and distribution of oral lesions among HIV-positive patients at General Hospital Ijebu-Ode?
2. How does immune status (CD4 cell count levels) correlate with oral lesion occurrence?
3. What is the effect of ART adherence on the prevalence of oral lesions?
4. What are the risk factors contributing to oral lesion development in HIV-positive patients?

Research Hypotheses

1. Immune status (CD4 cell count levels) has no significant correlation with oral lesion occurrence.
2. ART adherence have no significant influence on prevalence of oral lesions.

METHODOLOGY

This study adopts a descriptive design, using both retrospective patient records and clinical examinations to determine the prevalence of oral lesions in HIV patients. The study was carried out at General Hospital IjebuOde, a secondary health care facility that offers treatment, counseling and oral health care services in the State of Ogun to patients with HIV/AIDS. The study population consists of HIV-positive patients that receive care at General Hospital, Ijebu-Ode. A systematic random sampling method will be used to select eligible patients from hospital records. The sample size for this study is fifty (50) HIV patients attending State Hospital Ijebu-ode. Structured questionnaires was dropped with the medical personnel working at the Heart-to-heart clinic at State Hospital, Ijebu ode to be shared among the patients because of confidentiality. Descriptive statistics (frequencies and percentages) was used to summarize oral lesion types and patient demographics. Chi-square was used to assess relationships between oral lesions and CD4 counts. Ethical approval was obtained from the General Hospital, Ijebu ode. Informed consent was obtained from participants prior to clinical examinations. Patient confidentiality and anonymity was strictly maintained. Data was used for research purposes only.

RESULTS

Table 1 Duration since HIV Diagnosis

Duration since HIV	Frequency	Percentage (%)
Less than 1 year	20	26.32
1-5 years	35	46.05
6-10 years	14	18.42
More than 10 years	7	9.21

Table 1 shows the time from the date of an individual's HIV diagnosis to the study date for a sample of 76 participants. The most common time frame was between 1-5 years after the diagnosis, at 46.05%, which represented 35 participants; therefore, it is the largest segment of the sample. The second most common time frame was less than one year post-diagnosis, at 26.32%, or 20 participants, which suggests there are a significant number of relatively new cases. Also, 18.42% of participants, or 14 participants, had been living with HIV for 6-10 years and 9.21% of participants, or 7 participants, had been living with HIV for more than 10 years. Overall, this distribution of data indicates that the majority of the sample has been diagnosed with HIV for a mid-term period (1-5 years) which could be attributed to better diagnostic methods, or increased testing in recent years. The smaller percentage of long-term HIV diagnoses (more than 10 years) may also be indicative of factors related to the length of time someone lives with HIV, including death, lost to follow up, or decreased testing in previous years.

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Table 2 Current CD-4 Count Level

Current CD-4 Count Level	Frequency	Percentage (%)
Below 200	17	22.37
200-350	41	53.95
351-500	17	22.37
Above 500	1	1.32

According to Table 2, which describes the current CD-4 counts for 76 persons living with AIDS, the majority (41 persons, or 53.95%) have CD-4 counts between 200 and 350, indicating a large proportion with moderately depressed immune systems. The number of persons with CD-4 counts below 200, and those having counts of from 351 to 500, is equal (17 persons in each category), which indicates equal representation of those with severely low immunity and those having a relatively greater degree of immune function. Observing that only 1.32% (one person) has a CD-4 count of over 500 indicates that very few of the persons of this investigation present approach normal immunity. These numbers indicate a preponderance of persons with moderate to low CD-4 counts and possibly indicate that there are still difficulties in the way of having optimal recovery of immunity, perhaps due to insufficient early diagnosis, not always continuing treatment, or, perhaps lack of adequate antiretroviral therapy.

Table 3 ART Adherence Level

ART Adherence Level	Frequency	Percentage (%)
Strict Adherence	59	77.63
Occasionally miss doses	10	13.16
Frequently miss doses	5	6.58
Not on ART	2	2.63

The results from Table 3, representing adherence to antiretroviral therapy (ART) among 76 people living with HIV, show that an overwhelming 77.63 percent (59 individuals) strictly adhere to their ART regimen, indicating a high level of dedication to treatment and ultimately leading to positive health effects. The data shows that 13.16 percent (10 individuals) will occasionally miss a dose and 6.58 percent (five individuals) will frequently miss a dose; therefore, it can be concluded that a total of 19.74 percent will have difficulty consistently adhering to the prescribed regimen, which may hinder the patient's immune recovery and contribute to the development of drugresistant virus. In addition, 2.63 percent (two individuals) are currently not taking ART, which may be due to various reasons including new diagnoses, treatment ineligibility, or lack of access to care. The overall adherence rates in this study were very high and should encourage effective HIV management, while at the same time illustrate a small but significant portion of the population who are experiencing difficulties with adherence to their ART regimen. Therefore, these findings strongly emphasize the need for specific interventions, such as counseling, reminders, etc., and/or addressing socio-economic issues that impact adherence, to assist the 19.74 percent of the population who experience varying degrees of inconsistency in their adherence and the 2.63 percent who do not take ART. This intervention would lead to optimal treatment outcomes and decreased risk of HIV-related complications.

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Table 4 Oral Hygiene Practices

Oral Hygiene Practices	Frequency	Percentage (%)
Brush twice daily	38	50.00
Brush once daily	35	46.05
Rarely brush	1	1.32
Use mouth wash regularly	2	2.63

According to Table 4, there are 76 people surveyed regarding oral hygiene, and of those 76 people surveyed, 50.00%, or 38 people, brushed their teeth twice per day; therefore, it is clear that 50.00% of the sample studied is practising good oral hygiene as recommended by dentists and hygienists. On the other hand, 46.05% or 35 of the sample study also brushed their teeth once per day, and although they were using some form of oral hygiene, it does not represent best practices. There was only 1 person who said they "rarely" brushed their teeth; however, there is clearly a small but concerning amount of neglect in oral hygiene practices from this single individual that may lead to an increased risk of dental problems. Also, 2.63% or 2 individuals reported that they used mouthwash on a regular basis; therefore, the percentage of people using mouth wash has been shown to be very low in this study. These percentages demonstrate a general positive trend in oral hygiene practices since 96.05% of the sample population were found to have engaged in daily tooth brushing, but there appears to be opportunity for advancement in the promotion of routine and consistent oral hygiene practices based upon the nearly even split between those who brush their teeth once per day and those who brush twice per day. The low percentage of people using mouthwash and the fact that one individual reported that they "rarely" brushed their teeth, demonstrates the need for focused oral health education and intervention efforts, especially for populations at risk of developing oral disease, so that the oral hygiene of all individuals can be improved and the complications associated with poor oral hygiene can be prevented.What is the prevalence of oral lesions among HIV-positive patients at General Hospital Ijebu-Ode? Figure 1: Prevalence of Oral Lesion

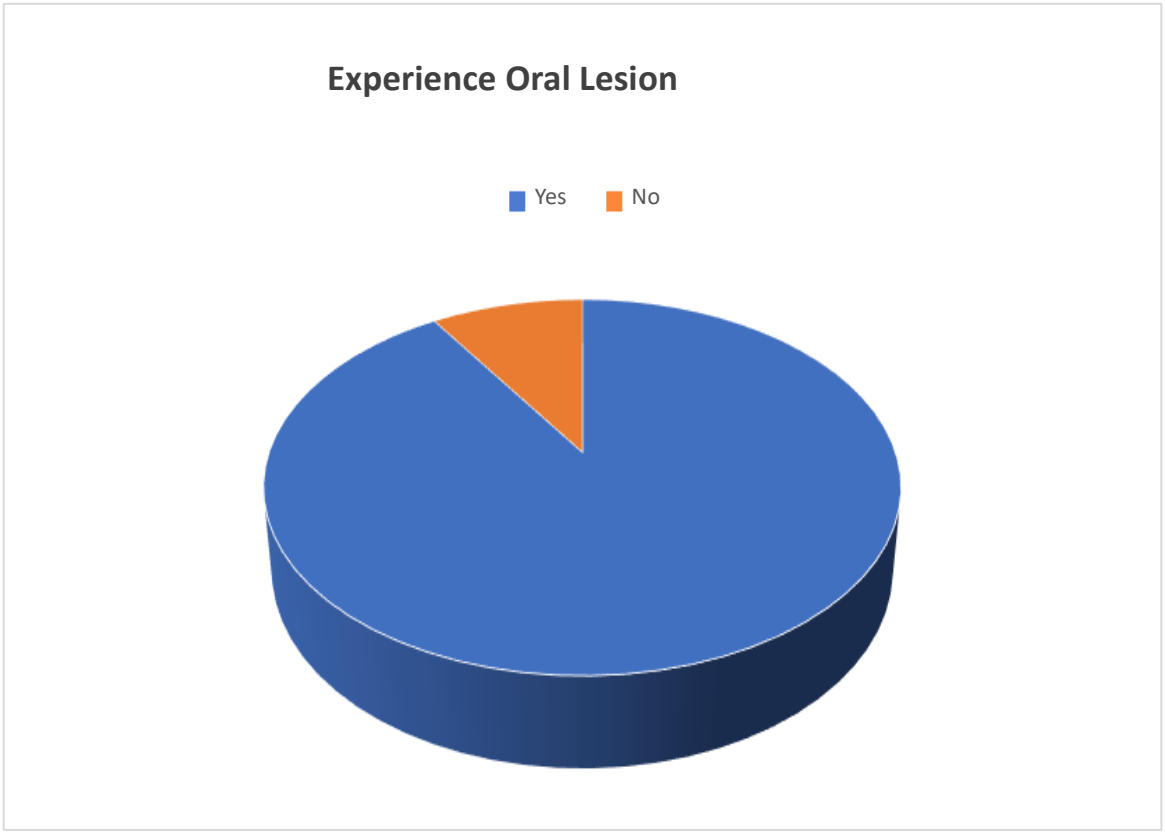

Table 5 Prevalence of oral lesions among HIV-positive patients at General Hospital Ijebu-Ode

S/N	QUESTION	SA	A	D	SD
1	I have been diagnosed with oral lesions by a healthcare professional.	35 (46.1)	37 (48.7)	4 (5.3)	0 (0.0)
2	I experience pain or discomfort due to oral lesions.	26 (34.2)	32 (42.1)	16 (21.1)	2 (2.6)
3	My oral lesions have persisted for a long time.	22 (28.9)	38 (50.0)	15 (19.7)	1 (1.3)
4	The presence of oral lesions affects my ability to eat or speak.	20 (26.7)	44 (58.7)	10 (13.3)	1 (1.3)

The results regarding the prevalence of oral lesions in HIV positive-patients at General Hospital Ijebu Ode clearly demonstrate the considerable burden of oral health problems faced by this group of individuals. The majority of participants responded to the question as to how often they experienced oral lesions; 48.7% of participants agreed very strongly and 42.1% agreed somewhat strongly (combined total = 90.8%) indicating they regularly experience oral lesions. In addition, an overwhelming number of participants (94.8%) confirmed they have been professionally diagnosed with oral lesions. 46.1% of the participants agreed very strongly and 48.7% agreed somewhat strongly (total 94.8%) of having received a professional diagnosis, indicating a wide range of clinical identification of these lesions. Symptoms associated with pain/discomfort were common as well, as indicated by the fact that 34.2% agreed very strongly and 42.1% agreed somewhat strongly (combined total of 76.3%) that they suffered from discomfort/pain due to oral lesions. Also, the persistence of lesions is notable as evidenced by 28.9% agreeing very strongly and 50.0% agreeing somewhat strongly (combined total of 78.9%) that oral lesions persisted for a long time. Additionally, it is noted that 85.4% of participants agreed that their ability to eat/speak was affected by oral lesions, with 26.7% agreeing very strongly and 58.7% agreeing somewhat strongly (total 85.4%). Collectively, the data suggest that there is a high prevalence of oral lesions in HIV positive patients who experience significant impairment to quality of life as a result of these lesions. Therefore, targeted oral health interventions along with regular dental care are necessary to reduce symptoms and improve functional outcome.

What are the risk factors contributing to oral lesion development in HIV-positive patients?

Table 6 Risk factors contributing to oral lesion development in HIV-positive patients

S/N	**QUESTION**	SA	A	D	SD
1	Poor oral hygiene contributes to my experience of oral lesions.	40 (52.6)	30 (39.5)	5 (6.6)	1 (1.3)
2	Smoking or alcohol use increases my risk of developing oral lesions.	24 (31.6)	46 (60.5)	4 (5.3)	2 (2.6)
3	My diet influences the occurrence of my oral lesions.	30 (39.5)	24 (31.6)	22 (28.9)	0 (0.0)
4	Stress or emotional distress has an impact on my oral health.	30 (39.5)	24 (31.6)	18 (23.7)	4 (5.3)
5	I believe other infections or conditions contribute to my oral lesions.	25 (32.9)	44 (57.9)	4 (5.3)	3 (3.9)

The data from Table 4.9 demonstrates how the respondents understand the various risk factors for the development of oral lesions in people with HIV. Overall, there appears to be a wide consensus regarding the

many factors influencing the development of oral lesions in people living with HIV. Specifically, a large majority of respondents indicated that they believe poor oral hygiene has contributed to their experience of developing oral lesions. In fact, 52.6% of the respondents "strongly agree" and 39.5% "agree," which indicates that a very strong emphasis is being placed on the maintenance of good oral hygiene practices to prevent the occurrence of oral lesions. Similar to oral hygiene, a high percentage of the respondents (31.6% strongly agree and 60.5% agree) believe that smoking or alcohol use have been significant risk factors in the development of oral lesions. This indicates that there is widespread knowledge and/or acknowledgment of the negative effects of engaging in unhealthy lifestyle habits. While fewer respondents identified diet as one of the contributing factors (39.5% strongly agree and 31.6% agree), it was surprising to note that nearly 30% of the respondents did not acknowledge this factor as having a contributing effect on their oral health. Additionally, approximately 40% of the respondents (39.5% strongly agree and 31.6% agree) reported that stress/emotional distress affect their oral health, while slightly over 24% (23.7%) of the respondents disagreed, indicating that stress related factors may be acknowledged but not necessarily widely accepted as a cause of oral health problems. Finally, the majority of respondents (32.9% strongly agree and 57.9% agree) believed that other infections/medical conditions also contribute to the development of oral lesions, demonstrating that many respondents have an appreciation of the interconnectedness of oral health with systemic health issues. Overall, these findings indicate that most HIV positive individuals recognize a variety of factors (modifiable and non-modifiable) that can influence the development of oral lesions including hygiene, substance use, diet, stress, and co-infections, thereby supporting the need for multi-disciplinary, comprehensive prevention programs in patient care.

Test of Hypotheses Hypothesis one

H_0: Immune status (CD4 cell count levels) has no significant correlation with oral lesion occurrence.

H_1: Immune status (CD4 cell count levels) has significant correlation with oral lesion occurrence.

N	Df	Tab	x^2	P-value
76	12	21.03	42.64	0.0002

From the provided analysis:

We reject the null hypothesis since χ^2 calculated > χ^2 tabulated and p-value < .05; therefore, there is statistical significance in the relationship between immune status (levels of CD4 cells), and the incidence of oral lesions. Thus, there is a positive association, at statistical significance levels, between lower CD4 levels and increased prevalence of oral lesions in HIV infected individuals. The data support existing literature indicating that decreased immunity leads to an increased risk for opportunistic infections of the mouth (Patton et al., 2022; Greenspan et al., 2021).

Hypothesis Two H_0: ART adherence have no significant influence on prevalence of oral lesions. H_1: ART adherence have significant influence on prevalence of oral lesions.				
N	Df	Tab	x^2	P-value
76	12	21.03	125.74	0.005

Since χ^2 calculated is greater than χ^2 tabulated, and since the P-value is less than 0.05, we reject the null hypothesis and thus conclude that ART adherence significantly affects the prevalence of oral lesions. The data indicate that improved ART adherence would reduce the number of oral lesions occurring in people with HIV/AIDS, which could be a result of both immune recovery and virological suppression (Nittayananta et al., 2020; Ramírez-Amador et al., 2021). Therefore, these results highlight the significant value of adherence support interventions as an essential component of overall HIV treatment.

DISCUSSION OF FINDINGS

Research results from this study at General Hospital Ijebu-Ode provided insight into the interactions of the immune status of patients, the use of antiretroviral therapy (ART), the oral hygiene habits of the patients and the occurrence of oral lesions in a sample of 76 HIV positive patients. The results align with and expand upon existing research, particularly in the context of resource-constrained settings like Nigeria.

CD4 Counts and Immunological Status: Results for CD4 count levels can be seen in Table 4.3. Fifty-three point ninety-five percent (53.95%) of participants were in the moderately compromised category (200 - 349 cells/mm3). Twenty-two-point thirty-seven percent (22.37%) of participants had CD4 counts less than 200 cells/mm3 and therefore were severely immunocompromised. Only one point three two percent (1.32%) of participants had CD4 counts greater than 500 cells/mm3 which is indicative of some level of immune recovery. Similar results have been found by Greenspan et al. (2021), who indicated that many HIV-positive individuals in developing countries have low CD4 cell counts because their diagnosis was delayed and they have limited access to ART. The large number of patients in this study with moderate to low CD4 cell counts indicates there are continued problems related to achieving maximum immune restoration, likely as a result of late initiation of ART and/or economic constraints as reported by Awoyemi et al. (2017) in Nigeria.

Adherence to ART: it was indicated that 77.63% of the participants strictly followed their ART regimen; 19.74% occasionally or frequently skipped doses, and 2.63% did not follow ART at all. High levels of adherence to ART for these participants align with research by Nittayananta et al. (2010) which stated that strict adherence to ART can improve immune status for HIV infected patients. Levels of adherence to ART that varied among participants mirror those observed in research conducted by Ramírez-Amador et al. (2021) who indicated that in resourcepoor environments, variations in adherence to ART may be attributed to practical problems such as drug shortages and barriers to transportation. Low levels of participation in ART also indicate the presence of access issues within Nigeria's health-care system (Awoyemi et al., 2017).

Oral Hygiene Practices: Results of the data presented on oral hygiene practices show that 50% of participants brushed their teeth two times per day, 46.05% once per day, 1.32% rarely brushed their teeth, and 2.63% brushed their teeth two times per day and rinsed with mouth wash every other day. While these data indicate an overall positive trend of oral hygiene, they do indicate a gap between good oral hygiene practices and optimal practices since approximately one-half of the sample had not brushed their teeth two times per day. Findings similar to those of this study were also reported by Coogan et al. (2015) who found that many HIV infected patients did not brush their teeth optimally because of lack of access to dental care and awareness of proper oral hygiene practices. Additionally, results indicating low use of mouth wash are consistent with reports from resourceconstrained areas where additional oral hygiene products are difficult to obtain (Patton et al., 2022).

Prevalence of Oral Lesions: the result demonstrates an extremely high prevalence of oral lesions**;** 90.8% report frequent oral lesions, 94.8% have received a professional diagnosis of these oral lesions, and 85.4% have experienced either eating or speech problems resulting from the oral lesions. Greenspan et al. (2021) also reported that oral lesions including candidiasis and periodontal disease were common among people living with HIV/AIDS, especially in low resource settings. Therefore, the large number of people affected by oral lesions in this study clearly shows that there has been an inadequate incorporation of dental care into HIV management as Coogan et al. (2025) stated.

Relationship Between the Participant's Immune Status and Presence of Oral Lesions: The result and Hypothesis 1 ($\chi^2 = 42.64$, $p = 0.0002$) support the existence of a statistically significant association between lower CD4 counts and greater frequency of oral lesions. As Patton et al. (2022) stated, having a CD4 count below 350 cells/mm³ was highly correlated with opportunistic oral infections related to decreased immune function. The fact that 94.7% of the participants recognized this association and that 96% of them believed that immune strengthening would result in fewer oral lesions supports the idea that the relationship exists and that immune restoration acts as protection against oral infections as previously noted by Nittayananta et al. (2020).

Influence of Antiretroviral Therapy Adherence on Oral Lesion Prevalence: Tables 5 and Hypothesis 2 (χ^2 = 125.74, p = 0.005) show that adherence to Antiretroviral therapy (ART) is associated with reduced prevalence of oral lesions. The fact that 97.4% of the participants reported experiencing fewer oral lesions when they adhered to their ART is similar to what Ramírez-Amador et al. (2021) stated about how consistent ART suppressed viral loads thereby reducing the presence of opportunistic infections. However, the 76% of participants who continued to experience oral lesions even though they adhered to their ART may be indicative of other contributing factors, such as poor oral hygiene, and/or other coinfections as stated by Coogan et al. (2015).

Factors Which Increase the Risk of Developing Oral Lesions: Table 6 illustrates poor oral hygiene (92.1%), smoking/alcohol use (92.1%), diet (71.1%), stress (71.1%), and co-infections (90.8%) as the most important factors which increase the risk of developing oral lesions. Patton et al. (2022) also stated that poor oral hygiene and lifestyle choices contributed to the development of oral lesions in people living with HIV/AIDS. The acknowledgment of co-infections as contributing factors to the development of oral lesions is consistent with what Greenspan et al. (2021) stated about how systemic infections can exacerbate oral health problems in people whose immune systems are compromised.

CONCLUSION

This research finds that the burden of oral lesions on HIV-Positive people is high, and these lesions occur due to low immunity, and their adherence to anti-retroviral therapy and other factors such as poor oral hygiene, smoking, alcohol use, diet, stress, and other infectious diseases. The majority of the participants had low immunity and few of them had achieved strong immune recovery which indicates how challenging it can be to effectively manage HIV. Many participants were adherent to Anti-Retro-Viral Therapy (ART) and experienced less oral lesions than those who did not adhere well to ART; however, a considerable number of participants experienced difficulties maintaining consistency to ART, and a smaller percentage of participants continued to develop oral lesions even when they were consistently adhering to ART. This data highlights the importance of both Medical and Behavioral aspects to address the needs of HIV Positive individuals and to improve health outcomes through an Integrated model of HIV and Oral Health Care.

RECOMMENDATIONS

On the basis of the conclusions of this study, the following recommendations are made:

1. A system of outreach and reminders, such as SMS messages, should be instituted so that those who are non-compliant may be encouraged in compliance. Other specific impediments, such as distance to travel and loss of medications can be effectively obviated through this system.
2. It is vital that routine dental examinations be completed at the HIV out-patient departments because of the prevalence of the lesions of the oral cavity.
3. Community programs should be instituted to encourage brushing twice daily, and mouth rinsing, particularly among those who brush once per day or not at all.
4. Interventions, which include decreases in smoking, use of alcohol, and stress intervention programs, should be instituted through educational health and counseling health programs.
5. Improvement in early access of HIV testing and initiation of antiretroviral therapy should be instituted, to effect immunologic recovery.
6. Encouragement of collaboration among dental professionals, nutritionists and HIV specialists may encourage control of co-infection and nutritional component effects on oral disease.

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