

# Associated oral lesions in human immunodeficiency virus infected children of age 1 to 14 years in anti retroviral therapy centers in Tamil Nadu

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## Abstract

**Aim:** To evaluate the prevalence of oral lesions status in human immunodeficiency virus (HIV) infected children of age 1 to 14 years in Anti Retro viral therapy (ART) centres in Tamil Nadu. **Materials and Methods:** A of total 326 HIV infected children, age 1 to 14 years of which 174 male children and 152 female children were examined for Oral lesions in the Department of Pedodontics and Preventive Dentistry, Rajah Muthiah Dental College and Hospital, Annamalai University in association with the ART centers in Villupuram, Vellore and HIV Homes in Thiruvannamalai, Trichy and Salem in Tamil Nadu towns. **Statistical Analysis:** Statistical Package for Social Science for Windows (version 11 code: 3000135939012345). **Result:** Of the total 326 children, 201 (61.65%) had oral lesions. (68 [20.86%] with Oral Candidiasis [OC], 54 [16.56%] with Angular Cheilitis, 27 [8.28%] with Necrotizing Ulcerative Gingivitis [NUG], 25 [7.66%] with Necrotizing Ulcerative Periodontitis [NUP], 18 [5.53%] with Linear Gingival Erythema [LGE] and 9 [2.76%] with Aphthous Ulcer.) Conclusion Among the oral lesions in HIV infected children, OC 20.86% was the predominant oral lesion followed by Angular Chelitis 16.56%, NUG 8.28%, NUP 7.66%, LGE5.53% and Aphthous Ulcer 2.76%.

**Keywords:** Oral lesions, prevalence, human immunodeficiency virus

## Introduction

Acquired Immuno Deficiency Syndrome (AIDS) is caused by the Human Immuno Deficiency virus (HIV) and is characterized by immunosuppression, which leads to a spectrum of clinical manifestations that include opportunistic infections (OI). Two genetically distinct populations of viruses known to cause AIDS are HIV-1 and HIV-2. HIV-2 type is responsible for AIDS in west Africa and India.<sup>[1]</sup>

The Government of India estimates that about 2.40 million Indians are living with HIV (1.93-3.04 million) with an adult prevalence of 0.31% (2009). Children (<15 yrs) account for 3.5% of all infections, while 83% are the in age group 15-49 years.<sup>[2]</sup>

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In Tamil Nadu, there are 49 ART centers. The number of patients reported for anti retroviral therapy (ART) treatment in the financial year 2009-2010 is 33670.<sup>[3]</sup>

The oral lesions represent early clinical features of clinical AIDS (for example, oral kaposi's sarcoma). They also form traditional entry or exit determinants for ART and determinants of anti-opportunistic infection therapy. The oral lesions can be used in disease staging and classification and also act as markers of other more subtle mucosal immune deficiency status often missed on clinical examination. The oral lesions individually correlate with CD4 levels in severely immunosuppressed patients and with CD4 levels when grouped together. They also act as cofactors affecting the rate of HIV disease progression.<sup>[4]</sup>

Seven cardinal lesions are OC, hairy leukoplakia, kaposi's sarcoma, LGE, NUG, NUP and Non Hodgkins lymphoma. These lesions may be present in upto 50% of people with HIV infection and in up to 80% of those with a diagnosis of AIDS. In case where a person's HIV status is unknown, lesions indicate the presence of HIV infection. Hairy leukoplakia and pseudomembranous candidiasis are the most common lesions seen in HIV infection and are used in all current classification of HIV disease.<sup>[5]</sup>

Pediatric HIV infection has been increasing over the years, Disease usually progresses faster and the outcome is more serious than in adults, resulting in a high mortality rate due to serious Opportunistic Infections (OIs). For this reason, early prophylactic measures and specific ART are mandatory. The absolute CD4+ lymphocyte count and percentage, and more recently the plasma viral load have been considered the

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most reliable markers of disease progression in HIV-infected patients and have been the basis for indicating ART as well as prophylaxis against OIs. The oral cavity is an important source of diagnostic and prognostic information in HIV-infected patients. The prevalence of OC has been observed to increase with severity of HIV infection. However, between 20% and 70% of children with HIV infection or AIDS have been reported to show clinical signs of OC.<sup>[6]</sup>

## Materials and Methods

The study population was selected from ART centers in Villupuram, Vellore and HIV Homes in Thiruvannamalai, Trichy and Salem in Tamil Nadu. 326 HIV infected children were selected for the study. The distribution of study subjects according to age and gender were given in Table 1 and Table 2 respectively. The Study population was selected based on the patient case records, the criteria for selection were: (1). HIV infected children of age 1 to 14 years (2). Mother to child transmission. The study protocol was approved by the Head of the Institution, Faculty of Dentistry and Ethical Committee, Annamalai University. Official permission was obtained from the ART centers in Villupuram, Vellore and HIV Homes in Salem, Thiruvannamalai and Trichy before the commencement of study. Survey form was prepared and all lesions were examined and diagnosed based on clinical descriptions according to the classification and diagnosis for orofacial lesions in HIV-infected children, proposed by Ramos-Gomez *et al.*<sup>[7]</sup> The HIV infected children were examined in their respective ART centers. The children were allowed to sit on a chair or stool, in a place where adequate light was present. A table with required instruments was placed within easy reach of the examiner. The recording clerk was made to sit close enough to the examiner so that instructions and codes could be easily heard and the examiner could see that findings were being recorded correctly. A recording clerk (Trained Dental Surgeon) was trained to enter the codes in the survey form. One dental

surgeon trained to conduct the interviews, interviewed the participating subjects in a private atmosphere to avoid biasing. The interview was followed by an intraoral examination by the principal investigator. The examinations were carried out with the plain mouth mirror and world health organization ball tip probe. All the instruments were sterilized prior to the examination. Examination was done according to Type-3 (1970). Diagnosis of Oral soft tissue lesions were made based on presumptive criteria given by Ramos-Gomez *et al.*<sup>[7]</sup> The data collected were tabulated and subjected to statistical analysis. Microsoft Excel/2000 (Microsoft Office XP) data spreadsheet was used and later exported to the Statistical Package for Social Science (SPSS) for Windows (version 11 code: 3000135939012345).

## Result

Of the total 326 children, 201 (61.65%) had oral lesions. {68 (20.86%) with OC, 54 (16.56%) with Angular Cheilitis, 27 (8.28%) with NUG, 25 (7.66%) with NUP, 18 (5.53%) with LGE, 9 (2.76%) with Aphthous Ulcer and 30 (9.20%) with fissured tongue}. The distribution of oral lesions according to age group. Of the total 326 children, 1-3 age group children had 4 (1.23%) oral lesions, 3-6 age group children had 24 (7.36%) oral lesions, 6-9 age group children had 33 (10.12%) oral lesions, 9-12 age group children had 93 (28.53%) oral lesions and 12-14 age group children had 47 (14.42%) oral lesions. Of the total 326 children, no lesions were seen in 83 (25.46%) children.

## Discussion

The HIV belongs to the lenti virus, a subfamily of the retrovirus. The transmission route in the pediatric population is principally the vertical, either before (intra uterine), during (intra partum) or after birth (through breast-feeding). However, the majority of infected children acquire the infection during birth, through exposure to infected blood and cervical vaginal secretions in the birth canal, where the HIV is found at high levels at the end of gestation and during birth.<sup>[8]</sup>

Oral lesions, most often related to opportunistic pathogens, represent an important problem to AIDS patients.<sup>[9]</sup> Oral lesions not only indicate infection with HIV, but they are also among the early clinical features of the infection and can predict the progression of HIV disease to AIDS.<sup>[5]</sup>

The development of HIV infection in children has different characteristics to those noted in adults, mainly due to the earlier acquisition of the virus, combined with the immaturity of the immunologic system and other body structures.<sup>[10-12]</sup> The highest incidence of AIDS occurs in the first 1 year of life and almost all cases of perinatal infection become symptomatic within the first 10 years of life. Children with AIDS compared to immune competent ones present with

**Table 1: Distribution of study subjects according to age groups**

Age group	No. of subjects	Percentage
1-3	13	3.99
3-6	55	16.88
6-9	71	21.77
9-12	116	35.58
12-14	71	21.78
Total	326	100

**Table 2: Distribution of study subject according to gender**

Gender group	No. of subjects	Percentage
Male	174	53.37
Female	152	46.63

disease patterns that were different in nature, severity and/or frequency.<sup>[12]</sup> The clinical feature of paediatric HIV infection includes the appearance of various oral lesions, some of which are considered AIDS diagnosis markers, such as recurrent OC and chronic enlargement of the parotid gland. The most frequently associated oral lesions are: Candidiasis, herpes simplex infection, LGE, parotid enlargement and recurrent aphthous stomatitis. Other viral and bacterial infections, including periodontal infections are less commonly associated, while hairy leukoplakia and Kaposi's sarcoma are rarely seen in HIV-infected children.<sup>[11]</sup>

Oral lesions, usually caused by opportunistic fungal or viral agents, occur often during HIV-infection. A key but not exclusive basis for pathogenesis involves reduced numbers and function of CD4 T cells; the resultant decrease in systemic and mucosal immune integrity is in turn associated with an increased frequency of oral lesions.<sup>[13]</sup>

Oral lesions have been associated with immunological dysfunction and reduced amounts of serum CD4+ T lymphocytes, mainly OC and oral hairy leukoplakia. Those are clinical predictors of AIDS progression and usually are associated with CD4+ T-lymphocytes count less than 200 cells/mm<sup>3</sup> and high viral loads levels in adult patients.<sup>[14]</sup> Hairy oral leukoplakia is a very rare oral lesion in HIV infected children. In contrast, in adults the incidence of Hairy oral leukoplakia varies from 5% to 43.2%.<sup>[15]</sup>

In the present study the overall percentage of oral lesions were 61.65% [Table 3]. This findings are similar to those reported by Sowole *et al.*<sup>[16]</sup> (61%), Chen *et al.*<sup>[17]</sup> (68%) and S. Pongsiriwet *et al.*<sup>[18]</sup> (57.5%)

OC was the most common oral lesions in children infected with HIV and is the first clinically observable manifestations of the disease. Candidiasis may be a significant value in predicting the development of AIDS in infected children.<sup>[7]</sup> In the present study, the prevalence of OC was found in 68 children (20.85%) [Table 4]. Prevalence rate of OC varied from 20% to 70% in published reports by Santos *et al.*<sup>[19]</sup>, Ramos-Gomez *et al.*<sup>[7]</sup>, Delgado *et al.*<sup>[8]</sup> The findings in the present study was similar to those found by Ashir *et al.*<sup>[6]</sup> (20.5%), Ketchem *et al.*<sup>[20]</sup> (25.53%), Pol *et al.*<sup>[21]</sup> (21.13%) Chen *et al.*<sup>[17]</sup> had reported a higher prevalence of OC of 44%. The reasons quoted by the author for the higher prevalence were lack of early diagnosis and medical care, poor nutritional status, being orphaned. Mittal<sup>[22]</sup> reported the presence of OC was found to be significantly associated with CD4/CD8 cells ratio and immune suppression.<sup>[22]</sup>

In this study, the prevalence of angular cheilitis was found in 54 children (16.57%) [Table 4]. The findings in the present study were similar to those reported by Ranganathan *et al.*<sup>[23]</sup> (20.3%), Chen, *et al.*<sup>[17]</sup> (21%). The reason reported for prevalence of angular chelitis were lack of early diagnosis and

**Table 3: Oral lesions percentage**

No. of subjects with oral lesions	Total no. of subjects	Percentage
201	326	61.65

**Table 4: Oral lesions in HIV-infected children**

Oral lesions	No. of lesions	Percentage
Oral candidiasis	68	20.86
Angular cheilitis	54	16.56
Necrotizing ulcerative gingivitis	27	8.28
Necrotizing ulcerative periodontitis	25	7.66
Linear gingival erythema	18	5.53
Aphthous ulcer	9	2.76
Fissured tongue	30	9.20
Total	231	70.85

HIV: Human immunodeficiency virus

medical care, poor nutritional status, minimal or sporadic access to ART medications, low CD4 lymphocyte counts, and being orphaned or abandoned.<sup>[17]</sup> Sen *et al.*<sup>[24]</sup> had reported a low prevalence of only 2.1% and this was due to the availability of ART drugs.<sup>[24]</sup>

NUG is a common early manifestation in HIV infected patients. In the present study, the prevalence of NUG was found in 27 children (8.28%) [Table 4]. Prevalence rate of NUG varied from 4% to 16%.<sup>[15]</sup> The findings in the present study were similar to those found by Chen *et al.*<sup>[17]</sup> (7%) The reason reported for prevalence of NUG were malnutrition and immunosuppression<sup>[8]</sup> and it has also been demonstrated that HIV-infected children often have relevant risk pathogens and habits, such as candidiasis infection and poor oral hygiene<sup>[25]</sup> and also gingivitis was associated to local plaque accumulation.<sup>[19]</sup>

NUP was less commonly associated with paediatric HIV infection.<sup>[7]</sup> In the present study, NUP was found in 25 children (7.66%) [Table 4]. The prevalence rate of NUP were varying from 2.2% to 5%.<sup>[26]</sup> The prevalence of NUP in the previous studies reported were Chen *et al.*<sup>[17]</sup> (7%) and Howell *et al.*<sup>[27]</sup> (8%). The reasons reported for prevalence of NUP were reduced CD4 cell counts, coupled with more traditional risk factors including pre-existing gingivitis, poor oral hygiene, poor diet<sup>[23]</sup> and elevated viral loads<sup>[24,25]</sup>.

LGE which was formerly referred to as HIV gingivitis.<sup>[7]</sup> In the present study, the prevalence of LGE was found in 18 children (5.52%) [Table 4]. The prevalence rate of LGE varied from 0% to 48%.<sup>[7,26]</sup> The findings in the present study were similar to those found by Sen *et al.*<sup>[24]</sup> (6.4%). The reason for prevalence of LGE were reduced CD4+ count of less than 200 cells/mm<sup>3</sup> but not with high viral load<sup>[26]</sup>, and poor oral hygiene, poor diet.<sup>[13]</sup>

In the present study, the prevalence of apthous ulcers was found in nine children (2.76%) [Table 4]. Apthous ulcers occur in approximately 2-6% of the adult HIV infected population and are more common among HIV infected children, especially due to drugs such as Didanosine (ddl) that may induce lesion<sup>[7]</sup> and most common immune mediated HIV related oral disorder.<sup>[28]</sup> The findings in the present study were similar to those found by Chen *et al.*<sup>[17]</sup> (6%), Sen *et al.*<sup>[24]</sup> (3.2%) and Ranganathan *et al.*<sup>[23]</sup> (4.2%). The reason explained for prevalence of apthous ulcers were immunosuppression, low CD4 and CD8 cell numbers and below normal neutrophil counts.<sup>[29]</sup>

In the present study, the prevalence of fissured tongue was found in 30 children (9.20%) [Table 4]. The prevalence of fissured tongue had been reported to occur as normal variant in less than 10% of population.<sup>[30]</sup> The prevalence of fissured tongue in the previous studies reported were Porter *et al.*<sup>[31]</sup> (5%). Fissured tongue developed in association with malnutrition and low vitamin A levels<sup>[32]</sup>, salivary hypofunction, vitamin B deficiency, and candidiasis.<sup>[29]</sup>

In the present study, four oral lesions were found in 1-3 years of age (1.23%), 24 lesions in 3-6 years of age (7.36%), 33 lesions in 6-9 years of age (10.12%), 93 lesions in 9-12 years of age (28.53%) and 47 lesions in 12-14 years of age (14.42%) [Table 5].

Oral lesions are prevalent in perinatally HIV-infected children. Sufficient dental personnel and facilities are required to ensure treatment and prevention for those children. Early detection of these lesions by dental practitioners will help in initiating prophylactic treatment against OI and significantly reducing associated morbidity, particularly in children where they tend to take a fulminant course.

**Conclusion**

61.65% had oral lesions like OC, angular cheilitis, NUG, NUP, LGE and apthous ulcer. Distribution of the oral lesions according to age wise was found to be, 1-3 age group children had 4 (1.23%) oral lesions, 3-6 age group children had 24 (7.36%) oral lesions, 6-9 age group children had 33 (10.12%) oral lesions, 9-12 age group children had 93 (28.53%) oral

lesions, 12-14 age group children had 47 (14.42%) oral lesions. Among the oral lesions in HIV infected children, OC 20.86% was the predominant oral lesion followed by Angular Cheilitis 16.56%, NUG 8.28%, NUP 7.66%, LGE 5.53% and Apthous Ulcer 2.76%.

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**Table 5: Distribution of no. of oral lesions according to age group**

Age group	No. of lesions	Percentage
1-3	4	1.23
3-6	24	7.36
6-9	33	10.12
9-12	93	28.53
12-14	47	14.42
Total	201	61.65

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