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# Oral manifestations in HIV+ children in Mozambique

## Manifestações orais em crianças HIV, em Moçambique

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**Abstract** *The scope of this study was to identify the prevalence of oral manifestations in HIV+/AIDS patients at the DIA Pediatric Hospital of Maputo. All 90 patients were included in the research. Data on dental caries (dmft/DMFT index), soft tissues and saliva flow were analyzed. Information on diet and hygienic habits was obtained in a semi-structured questionnaire. The t- student and chi-square tests were used for statistical assessment. The most frequent oral lesion was candidiasis (5.5%) and upon further oral examination the prevalence of parotid enlargement was 23.0%. The mean dmft 2.6 (SD 3.6) was considerably higher in relation to DMFT of 0.6 (SD 1.6), and the differences between them were statistically significant (P<0.05). The occurrence of mucosal lesions was higher in children who did not take antiretroviral therapy (ART) (p= 0.026). The use of ART is associated with reduced prevalence of oral lesions in HIV+ patients; however, rampant caries were highest in this group. Primary dentition of HIV+ patients should be considered high risk for caries.*

**Key words** *Mozambique, Oral manifestations, HIV infections, Pediatrics*

**Resumo** *O objetivo deste estudo foi identificar a prevalência das manifestações bucais em pacientes HIV+/SIDA do Hospital Pediátrico DIA de Maputo. Foram incluídos 90 pacientes na pesquisa. Cárie dentária (índice ceod/CPOD), mucosa e fluxo salivar foram avaliados. Informações sobre alimentação e hábitos de higiene bucal foram obtidas por meio de um questionário. Para a análise estatística foram utilizados os testes t-student e qui-quadrado. A lesão oral mais frequente foi a candidíase (5,5%) e no exame extra-oral foi observada uma prevalência de alargamento da parótida de 23%. A média do ceod foi 2,6 (± 3,6) dentes, consideravelmente alta em relação ao CPOD que foi de 0,6 (±1,6) dentes, sendo esta diferença estatisticamente significante (p<0,05). A ocorrência de lesões na mucosa bucal foi maior em crianças que não faziam uso da terapia antiretroviral (TRA). O uso da TRA esteve associado com a redução da prevalência de lesões bucais em pacientes HIV+, contudo cáries rampantes foram maiores neste grupo. Pacientes HIV+ mostraram maior risco de cáries na dentadura decídua.*

**Palavras-chave** *Moçambique, Manifestações bucais, Infecções por HIV, Pediatria*

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## Introduction

In worldwide it is estimated that there are 2.3 million HIV positive children from 0 to 14 years infected by mothers[1]. Many of those infected children were born in the 1980s, today, are with the disease under control, when before the expectancy life was 4 years old, nowadays this number has increased to 20 years old[2,3].

In Mozambique, AIDS is emerging rapidly affecting infant mortality. In 2006, about 99,000 children under the age of 15 were living with HIV or AIDS, the majority were below the age of five. Most children have been infected through mother-to-child transmission of HIV and many do not live for long without treatment [4].

Oral lesions indicate infections with human immunodeficiency virus (HIV). They are among the early clinical features of the infection and can predict progression of HIV disease to acquired immunodeficiency syndrome (AIDS). The presence and development of oral lesions are used as criteria for prophylaxis and therapy [5,6].

Oral health is considered integral and inseparable part of the general health of the individual. The absence of a healthy oral cavity can affect the quality of life, complicating the treatment of medical conditions and create or exacerbate psychosocial and nutritional problems[7]. In children, the quality of life related to health should be considered differently from adults. The high prevalence of HIV infection reinforces the need of dentists and his staff to update the prevention and treatment of diseases and the promotion and maintenance oral health of individuals with HIV / AIDS. These children are susceptible to infection by many microrganisms that have proliferated under conditions of immunosuppressive, causing injuries fungal, viral and bacterial, such as candidiasis, linear gingival erythema, herpes, and hypertrophy of parotid, among others[8].

Although the use of active retroviral therapy (ART) in HIV-infected children is promoting a reduction in the prevalence of oral manifestations over the years, there is an increase in the high prevalence of dental diseases, mainly due to the chronic influence of some factors involved in the process of HIV infection. Among them are the prolonged use of sugary products, changes in salivary flow and salivary glands caused by use of drugs, diet rich in carbohydrates to protein-calorie replacement, repeated episodes of hospitalization, poor oral hygiene, immunosuppression by infection of HIV and the lack of information about the practice of promoting oral health[3,9,10].

The prevention of oral infections and early diagnosis associated with oral manifestations increase the life expectancy and well being of the patient. However, it is still significant the number of children who live with the symptoms of the disease, making it essential and urgent to search for tools to improve oral health of children, since the prevalence of oral manifestations is very high. This study aims to evaluate oral manifestations of HIV-infected children in ambulatory of paediatric DAY of Maputo Hospital, Mozambique.

## Materials and Methods

### Ethical aspects

This project was approved by Maputo Central Hospital / Ministry of Health of Mozambique. Written consent for participation in the study was obtained from children's parents/caregivers.

### Sample

Ninety children diagnosed HIV-infected, attending the pediatric DAY Hospital, an unit of Maputo Central Hospital in Mozambique. Their HIV and medication status were confirmed through the patients file. The sample aged between 1.7 and 16 years old (mean 6,57).

Approximately 10% of the sample was re-examined in order to verify the intra-examiner reproducibility. Intra-examiner agreement was 0.84 (88.89%) expressed by the Kappa statistics. This value indicated reliability within almost perfect[11].

### Examination methodology

One previously calibrated examiner outdoors performed clinical examination, under natural light, using CPI probes ("ball point"), mirrors #5, according to the WHO Basic methods. Dental caries were registered using the dmft (total of decayed, missing, and filled primary teeth) and DMFT (total of decayed, missing, and filled permanent teeth) indexes[12].

Examination of the soft tissues of the face was based on inspection, palpation of the parotid region. To evaluate intra-oral tissues was used wooden spatula. Ramos-Gomez et al.[13], whom proposed a classification of oral-facial lesions associated with paediatric AIDS, recommended the use of this criterion.

The salivary flow was obtained in children above 6 years old (n=59). To collect saliva, they

were instructed to chew rubber during five minutes while they were expectorating into the cup. Later the researcher made the suction of the saliva and measured in millilitres using graduated syringe. Values below 1ml/min are considered low salivary flow[14]. For the parents/caregivers were applied semi-structured questionnaire addressing diet and hygienic habits.

**Data Analyses**

The descriptive and analytical approaches were used for data analysis. Descriptive results were analyzed as relative frequencies. Data were processed and analysed using Statistical packages STATISTICA 7.0. The *t*-student and chi-square tests were used for Statistical assessment. Odds Ratio was used to estimated influence of salivary flow and the use of ART in occurrence of lesions in the oral mucosa, parotid hypertrophy and dental caries. The data were analyzed using 5% significance level.

## Results

The sample comprised a total of 90 patients, being boys (n=44; 48.8%) and girls (n=46; 51.0%). Almost patients were taking active retroviral therapy (81.0%), only 18.8% were not in ART.

The salivary flow was evaluated in 59 children, where the low salivary flow was found in 76.2%. The parotid enlargement was the second manifestation (23%).

The analyses also showed no significance (p>0.050) between flow salivation and parotid hypertrophy, oral lesions in mucosal and dental caries (Table 1).

The total of mucosal lesions was about 12 cases (13.3%) distributed among 7 patients. The most common was angular queilitis (a type of candidiasis) that was present in 4% of patients. The distribution of mucosal lesion's was: angular chelitis, gingivitis, herpetic stomatit, herpetic stomatit + angular chelitis, pseudomembraneous candidiasis + angular chelitis + gingivitis; fistula and herpetic labials.

The "t" Student test showed statistically difference between use of ART and oral lesions in mucosal, showing that the mean of lesions was higher than those did not use of ART (p= 0.026). When the variable "lesions" was categorized as presence and absence of oral lesion (Table 2) for calculate the chi-square test, was found no association (p=0.472). The ART's users presented oral lesion was small (n=7). However, the Odds Ratio showed those patients who make use of ART have 2.39 times less likely to have lesions in the oral mucosa.

The Odds Ratio analyses showed no statistical significant (p=0.328) between use of ART and parotid hypertrophy.

The mean of dmft was 2.6 while the DMFT score showed 0.6. Most of all dental caries were rampant, especially in primary dentition. "t" Student analyses the comparison between those who taking ART and dmft/DMFT showed no significance (p=0.798 / p=0.090), but when the variable dmft/DMFT was categorized into presence and absence of caries observed association between dental caries and the use of ART (p <0.000). The table 2 shows the distribution of mucosal lesion, hypertrophy of parotid gland and dental caries according to use of antiretroviral therapy (ART).

Almost of used fluoride paste (95%), and only (1.1%) use dental floss. Half of the patients

**Table 1.** Association of mucosal lesion, parotid hypertrophy and dental caries according to salivary flow.

| | Low salivary flow | Normal salivation | | |
|---|---|---|---|---|
| | n (%) | n (%) | OR (IC=95%) | p value |
| **Total** | **45 (76.3)** | **14 (23.7)** | | |
| Mucosal Lesion | | | | |
| Presence | 4 (8.9) | 3 (21.4) | 0.36 (0.07 – 1.84) | 0.427 |
| Absent | 41 (91.1) | 11 (78.6) | | |
| Parotid Gland | | | | |
| Hipertrophy | 9 (20.0) | 4 (28.6) | 0.63 (0.16 – 2,46) | 0.759 |
| Normal | 36 (80.0) | 10 (71.4) | | |
| Dental caries | | | | |
| dmft=0 | 14 (31.1) | 3 (21.4) | 1.66 (0.40 – 6.88) | 0.718 |
| dmft>0 | 31 (68.9) | 11 (78.6) | | |
| DMFT=0 | 32 (71.1) | 8 (57.1) | 1.85 (0.53 – 6.38) | 0.516 |
| DMFT>0 | 13 (28.9) | 6 (42.9) | | |

**Table 2.** Association of mucosal lesion, hypertrophy of parotid gland and dental caries according to use of antiretroviral therapy (ART).

| | Without ART | With ART | | |
|---|---|---|---|---|
| | n (%) | n (%) | OR (IC=95%) | p value |
| **Total** | **17 (18.8)** | **73 (81.1)** | | |
| Mucosal Lesion | | | | |
| Presence | 3 (17.6) | 6 (8.2) | 2.39 (0.53 a 10.73) | 0.472 |
| Absent | 14 (82.4) | 67 (91.8) | | |
| Parotid Gland | | | | |
| Hipertrophy | 6 (35.3) | 15 (20.5) | 2.11 (0.67 – 6.63) | 0.328 |
| Normal | 11 (64.7) | 58 (79.5) | | |
| Dental caries | | | | |
| dmft=0 | 12 (70.6) | 18 (24.7) | | 0.000 |
| dmft>0 | 5 (29.4) | 55 (75.3) | 7.33 (2.27 – 23.66) | |
| DMFT=0 | 16 (94.1) | 55 (75.3) | | 0.168 |
| DMFT>0 | 1 (5.9) | 18 (24.7) | 5.24 (0.65 – 42.30) | |

revealed that they brush their teeth twice and three times a day. One third of the children had a bleedings gum when they were brushing. Almost half children (48%) related consume sugar between the meals.

## Discussion

Mozambique is one of the countries of the world most affected by the HIV / AIDS, with an estimated prevalence of 16.2%. Half of young population, 99,000, are HIV-infected and only 8% of these have access to antiretroviral therapy (ART)[4]. In this study the use of ART was very usual probably due to the fact that the evaluated subjects attending at pediatric DAY hospital. Institutions like this are important for care and supervision of HIV individuals, providing care, thereby increasing the expectation and quality of life, including contributing to oral health.

Low flow salivation were most often found in these patients, as a side effect of antiviral medications or of the other antihypertensive, antidepressant, anxiolytic or analgesic medications commonly prescribed for patients with HIV infection. Although was not found relation between salivary flow and oral lesions (dental caries and mucosal lesions), the oral dryness presents a significant risk factor for caries and xerostomia also contributes to oral candidiasis, mucosal injury and dysphagia and is often associated with pain and reduced oral intake of food[15].

The secondly common oral HIV manifestation was parotid gland disease, characterized clinically by gland enlargement. Parotid hypertrophy has been recognized as a distinct feature of HIV infection in children since the disease was first described. The parotid hypertrophy is a predictor of positive prognosis and long-term survival in HIV-infected children[16].

In the developing world, the prevalence of these lesions in children may vary from country to country[17]. In a South African study, the data showed higher prevalence with 63% of paediatric outpatients having oral facial lesions associated with HIV disease. Pseudomembranous candidiasis was the most commonly identified lesion, followed by oral ulceration and then oral hairy leukoplakia. In the same study, almost 50% of children in non-hospital institutions had unilateral parotid hypertrophy[18]. The prevalence of oral Kaposi sarcoma and ranula were increasing in HIV-infected children in Zimbabwe[19]. Several studies have reported an increase in the number of HIV-infected children with cancrum oris, cases reported from Lesotho, South Africa and Zimbabwe[17-19].

In the United Republic of Tanzania oral candidiasis and oral hairy leukoplakia were strong predictors for HIV infection. In the Democratic Republic of the Congo, oral candidiasis was one of several clinical features related to HIV seroconversion. In Nigeria 27% of cases were associated with advanced HIV infection. In Zambia erythematous candidiasis was the only lesion significantly associated with CD4+ lymphocyte less than 200 cells/mm$^3$ [15].

This present study illustrated two forms of candidiasis, pseudomembraneous candidiasis and angular chelitis. World workshop on HIV and oral lesions concluded that oral candidiasis is the most common lesion in children, but there is a lack of data in poor countries. Noma is seen

in poor countries. Oral candidiasis, ulcerative periodontal disease and xerostomia is strongly associated with the progression of HIV disease[20]. Therefore, the use of ART has showed a lower frequence of oral manifestations in these patients.

In the study of Chidzonga[21], the sample was composed by 156 patients at age range from 1 to 56 years. Candidiasis (55.1%) was the most common lesion with the pseudomembranous type (55.8%) predominating. High prevalence of Kaposi's sarcoma (18.6%), salivary gland disease (12.2%) and cancrum oris (3.8%) were noted[21].

In South Africa an oral examination was performed on 87 children ranged between 3.2 and 7, who were not receiving antiretroviral treatment. Rampant caries early in childhood was found in 19 (21.8%) children, with 5 children suffering severe pain from multiple carious teeth. In the hospice section of the homes all 12 children had clinically detectable candidiasis, while in 4 (33.3%) there was an associated bleeding and ulceration of the oral mucosa, impairing their ability to eat[22].

The study in Romani population consisted of 173 children at age range 6 to 12 years, the most common oral and perioral lesions included: candidiasis (29%), ulcers (15%), salivary gland disease (9%), necrotizing ulcerative gingivitis/periodontitis (5%), linear gingival erythema (4%), labial molluscum contagiosum (3%), oral warts (2%), hairy leukoplakia (2%), and herpes zoster (1%). One or more oral/perioral lesions occurred in 55% of the children. Severe dental caries was noted in the majority of children (dmfs/dmft 16.9/3.7 and DMFS/DMFT 8.1/3.1)[23].

This survey revealed the prevalence of dental caries was high in primary dentition. In 1991, Gehrke and Johnsen[24] reported the first case of the bottle caries associated with ART, where a child of two years was associated with use of Retrovir bottle at night and bad oral hygiene. According to Howell et al.[25] the prevalence of caries in HIV children was very high, especially with deciduous dentition. Tofsky et al.[26] found a mean dmft average of 8.3 for children with HIV, while for children not infected with HIV this average was 3.1 teeth, which shows, according to the authors, the need of guidance and treatment for those infected patients. A comparative study of the prevalence of caries, by Souza et al.[10] in HIV infected children and children without evidence of immunosuppression, showed statistically significant difference between the average mean dmft (5.29; 2.59) and DMFT (2.36; 0.74) of the two groups, respectively. Other recent studies showed that the high prevalence of caries in infected children seems to be greater in those that are in advanced stage of disease and with more severe degree of immunosuppression[27]. Studies have attributed the relationship between the presence of dental caries with the use of ART in syrup form with sugar[24], which may partly explain the higher prevalence dental caries in deciduous teeth of individuals in this study. In addition, the diet habits reported in present study showed that there was increase of sugar consumption between meals.

The exploratory questions showed that the almost children use dentifrice with fluoride, for 3-times a day or more (55.6%). However, these results should be carefully analyzed due the high prevalence of dental caries in these patients.

It is important to integrate oral health research into other health care research programmers as well as the caregivers because the control of dental caries contingent on the positive influence of the mother or the guardian, who must supervise the oral hygiene. The caregiver influences the child with their perceptions, values and estimates, which should be considered in care. Oral health care providers should familiarize in detection, recognition and management of these signs and symptoms of HIV/AIDS in neck and head regions.

## Conclusion

There is a need to update and revise the classification criteria for diagnosis of oral manifestations in children with HIV infection to include data from Africa. It would seem that patients who make use of ART have high prevalence of caries and less likely to have lesions in the oral mucosa.

There is a need to centralize research efforts in poor countries to support standardized studies in order to explore the use of oral lesions as surrogate markers for the initiation of antiretroviral therapy and prophylaxis of opportunistic diseases.

## Contributors

SHC Sales-Peres, MAA Mapengo, PG Moura-Grec, JA Marsicano, AC Sales-Peres and A Sales-Peres participated in the article conception, data analysis and interpretation, article write-up, critical revision and approval of the final version for publication.

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