

## รายงานผลการวิจัย

การศึกษาความชุกของรอยโรคในช่องปากของเด็กติดเชื้อเอชไอวี

จากแม่สู่ลูกในเชียงใหม่: การศึกษานำร่องภาคตัดขวาง

Prevalence of Oral Manifestations of Vertically HIV infected

Children in Chiang Mai, Thailand: a Pilot Cross-Sectional Study.

### คณะผู้วิจัย

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**Title: Prevalence of Oral Manifestations of Vertically HIV infected  
Children in Chiang Mai, Thailand: a Pilot Cross-Sectional Study.**

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## Abstract

**Objective.** To describe the prevalence of dental caries status and oral lesions in perinatally HIV-infected children.

**Design.** A cross-sectional study of perinatally HIV-infected children.

**Setting.** Paediatric HIV outpatient department at the Nakhon Phanom Provincial Hospital, Chiang Mai, Thailand.

**Sample and methods.** Forty children with perinatal HIV infection with the age ranged from the newborn to twelve years were eligible and selected for a study. These children were examined for dental caries status and oral lesions. Numbers of children with the history of receiving of antifungal therapy and antiretroviral (ART) were recorded. The oral rinse method or swab were use to isolate the *Candida*. Isolates of *Candida species* were characterized

**Results.** Dental caries indices were as the following: DMFT, 2.1; DMFS, 2.1; dft, 4.1; dfs, 10.9. 57.5% of all children had one or more oral lesions. Oral candidiasis and hairy leukoplakia were the most common oral lesions. Only 12.5% of children had received ART. 22.5% of children had a history of receiving antifungal therapy. Yeasts were isolated from 28/40 ( 70 %) of HIV-infected children. *C. albicans* was the most common yeast (26/28 cases) and the other two were *C. glabrata* and *C. krusei*.

**Conclusions.** Dental caries status and oral lesions were relatively high and lack of ART was evident in this present study. Significant treatment and prevention for dental caries and oral lesions were needed for children with HIV infection in Northern Thailand. Further, the availability of ART to these HIV-infected children was definitely called for.



## Introduction

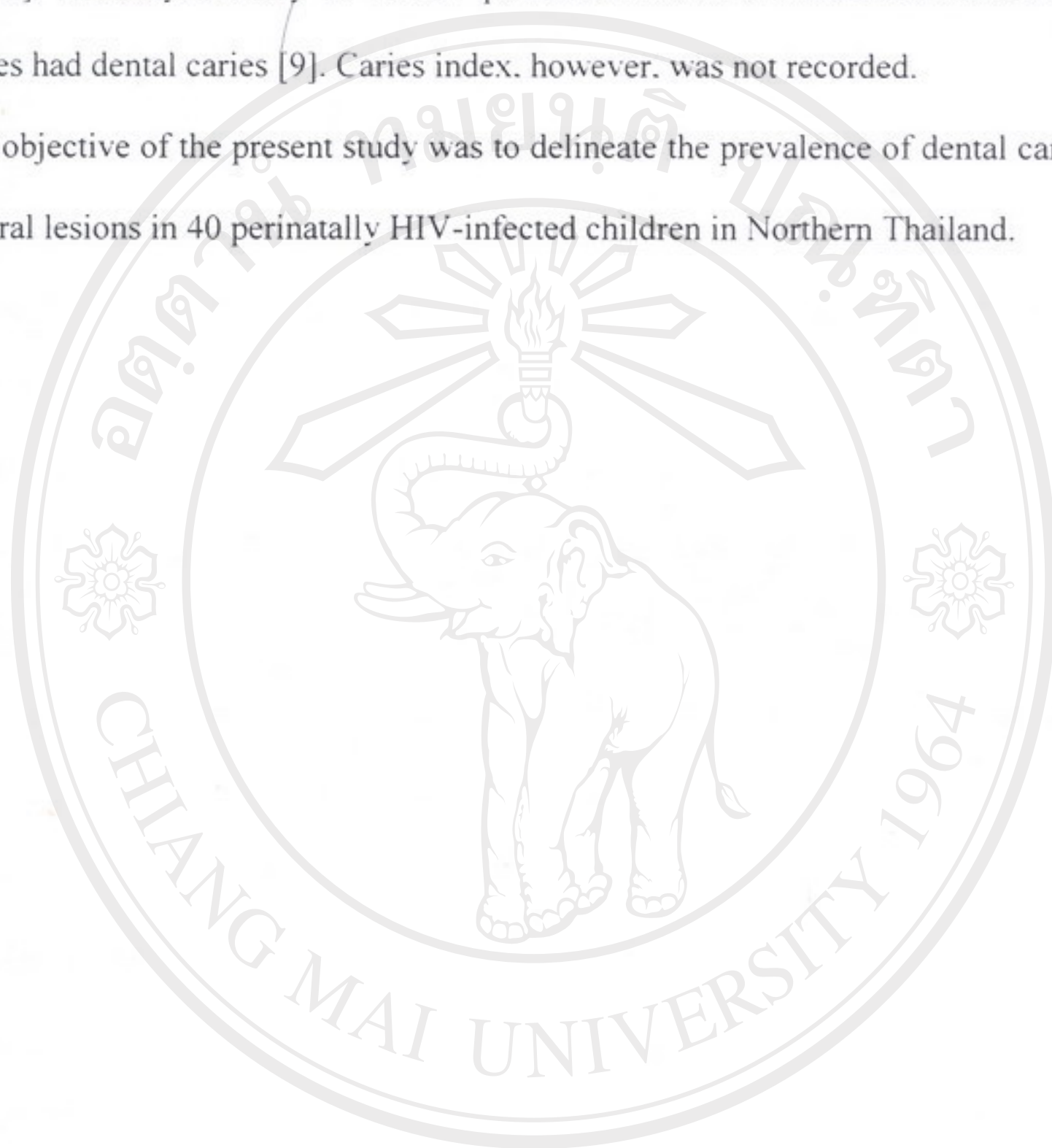
Human immunodeficiency virus (HIV) infection remains serious causes of morbidity and mortality globally and in Asia, especially in Thailand. The first case of HIV infection in Thailand was reported in 1984 [1]. Since then the rate of new infected cases was explosive and only became stable recently. Even so, it is currently found that more than 150,000 out of approximately 63 million are diagnosed with acquired immunodeficiency syndrome (AIDS) in Thailand [2]. The most prevalent area is in Northern Thailand, including Chiang Mai province.

Oral lesions are common in adults with HIV infection and have been well characterized in Thailand. Essentially, the most common oral lesions were candidiasis and hairy leukoplakia [3,4] and may be used as markers for disease progression or immunosuppression in adult patients [4].

Although oral manifestations of HIV infection in adults have been well established, little is known about oral lesions in children, especially of Asian population. The first cases of HIV infection in children were reported in late 1980s. Up until now, HIV-infected children have increased throughout the world. It is estimated that approximately 98% of HIV-infected children in the developing countries have acquired HIV from their mothers, during pregnancy, at delivery or through breastfeeding [5]. In Thailand, it was found that at least 7,710 children whose ages ranged from 0 to 9 years were infected with HIV [2]. Approximately, one-seventh of those children have lived in Chiang Mai province.

Oral health status in HIV-infected children has mainly been investigated in the western population. High caries index and plaque and gingivitis scores have been reported [6-8]. Recently, a study in 45 HIV-positive children in Thailand revealed that thirteen cases had dental caries [9]. Caries index, however, was not recorded.

The objective of the present study was to delineate the prevalence of dental caries status and oral lesions in 40 perinatally HIV-infected children in Northern Thailand.



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## Methods

Forty perinatally HIV-infected children whose ages ranged from the newborn to twelve years were recruited from the paediatric HIV outpatient department, Nakhon Phanom Provincial Hospital, Chiang Mai, Thailand during January-March 2002. All patients were diagnosed as HIV infected by the methods of repeated enzyme-linked immunosorbent assay (ELISA), ELISA with Western blot confirmation test and/or repeated polymerase chain reaction (PCR) [10]. Examinations of oral lesions were performed according to the classification and diagnosis for orofacial lesions in HIV-infected children, proposed by Ramos-Gomez *et al.* [11]. Dental caries were recorded clinically, using the dft/dfs index for primary teeth and DMFT/DMFS index for permanent teeth. The history of receiving of antiretroviral (ART) and antifungal therapy was recorded.

The parents or guardians of all children consented to oral examinations for research purposes. This project was approved by Human Subject Protection Committee, Faculty of Dentistry, Chiang Mai University, Chiang Mai, Thailand.

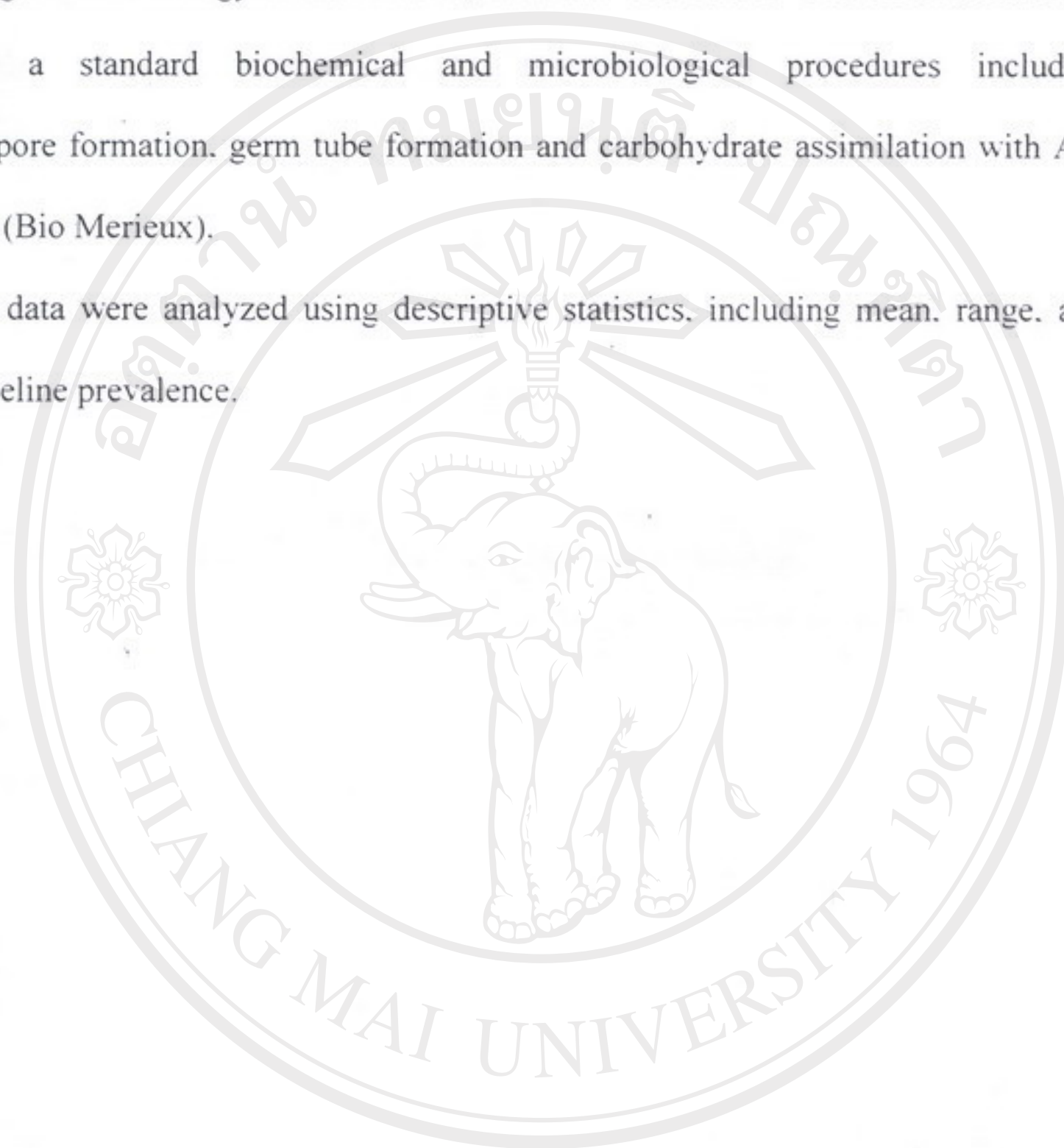
### Laboratory Investigation of Fungal Infection in HIV-Infected Children

The samples were collected by an oral rinse method previously described. Briefly, a 10-ml sample of PBS was swirled in the mouth for 1 min, then expelled, and inoculated onto Sabouraud's dextrose agar using a spiral plater. The resultant growth was quantitated. In case of young children that an oral rinse could not be performed, samples were obtained by the oral swab. Briefly, samples were collected by rubbing a sterile cotton swab over the dorsal surface of the tongue. The swabs were immersed in PBS and then taken to the laboratory for culture.

### Microbiology (Phenotypic Study)

Differentiation of *Candida* species was studied by using CHROMagar Candida (CHROMagar Microbiology, Paris, France) medium. The results will be confirmed by employing a standard biochemical and microbiological procedures including chlamydospore formation, germ tube formation and carbohydrate assimilation with API 20 C AUX (Bio Merieux).

All data were analyzed using descriptive statistics, including mean, range, and percent baseline prevalence.



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## Results

Of the 40 HIV-infected children examined, 18 were boys and 22 were girls. The age of these children ranged from 1.5 to 12 years with the mean of 5.5 years. Regarding children's dentitions, 62.5% (25/40) were in primary dentition, 32.5% (13/40) were in mixed dentition, and 5% (2/40) were in permanent dentition. The caries index of HIV-infected children is shown in Table 1.

**Table 1. Caries index in HIV-infected children**

Caries index	HIV-infected Thai children
DMFT	2.1
DMFS	2.1
Dft	4.1
Dfs	10.9
Caries free	40% (16/40)

Oral lesions were present in 23/40 (57.5%) of the children. Of those with oral lesions, twelve patients (30%) had only one oral lesion and 11 patients (27.5%) had more than one lesion. Types of oral lesions are described in Table 2. Of 40 patients, only five cases (12.5%) had received ART: AZT alone (1 case), AZT and ddI (2 cases), and d4T and ddI (2 cases). Nine cases (22.5%) had a history of receiving antifungal therapy: systemic itraconazole (4 cases), systemic ketoconazole (4 cases), and topical nystatin (1 case). None had antifungal medication as a prophylaxis.

Yeasts were isolated from 28/40 (70 %, range from few to  $> 10^5$  CFU/ml) of HIV-infected children. *C. albicans* was the most common yeast (26/28 cases) and the other two were *C. glabrata* and *C. krusei*.

Table 2. Oral lesions in 40 HIV-infected children

Oral Lesions	n	Percent (%)
Candidiasis:	18	45.0
Pseudomembranous	13	32.5
Erythematous	10	25.0
Angular Cheilitis	4	10.0
Hairy leukoplakia	9	22.5
Linear gingival erythema	8	20.0
Recurrent aphthous ulcer (RAU)	2	5.0
Gingival bleeding due to idiopathic thrombocytopenia purpura (ITP)	1	2.5
Children with more than 1 lesion	11	27.5



## Discussion

In the present study, most patients had the primary and mixed dentitions. Only two cases had the permanent dentition. The dental caries index was not higher in HIV-infected children ( $dft = 4.1$ ,  $dfs = 10.9$ ) than in general children lived in the same area at the similar age group ( $dft = 4.9$ ) [12], but significantly lower in HIV-infected children than in general Thai children at the similar age group ( $dft = 6.0$ ) [13]. We speculated that the main reason of low dental caries index in Northern Thai population, either children with HIV infection or general children, was due to high intake of natural fluoride, found to be enriched in this region of the country [14]. In fact, dental fluorosis is regarded highly prevalent in this area. When compared with HIV-infected children in the U.S.A. ( $dft = 3.3$ ,  $dfs = 10.5$ ) [15], the caries index in our study appeared to be similar to but was higher than general US children ( $dft = 1.9$ ,  $dfs = 4.1$ ) [16]. Taken together, these findings indicate that dental caries in Thai children, regardless of HIV infection, remains in need for treatment and prevention especially when compared with the developed country like the U.S.A.

Oral manifestations in HIV-infected children are among the earliest and most common clinical signs of paediatric HIV disease. But they have yet infrequently been reported in the literature, especially in Asian populations. To our knowledge, there was only a report dealing only with oral lesions in HIV-infected children in Asia [9]. The lack of information of oral manifestations in children with HIV infection in Asia was obvious. In the present study, we found that 57.5% of HIV-infected children had one or more oral lesions. These findings were in line with previous studies of HIV-positive children in Brazil (61%) [17], Romania (55%) [18], and Thailand (49%) [9]. These numbers are



considerably high when compared with that of HIV-infected US children (27%) [19]. The differences of the results may be due to lack of availability of ART, known as one of the increased risk factors for HIV-related oral lesions [20], to children living in the developing countries. In Thailand, only a small number of HIV-infected children received ART [9]. These are consistent with our study, where only 12.5% of patients had ART.

The most common finding for oral lesions in our study was oral candidiasis (45%), followed by hairy leukoplakia (22.5%), linear gingival erythema (20%), RAU (5%), and ITP (2.5%). When compared with the classification of orofacial lesions associated with paediatric HIV infection developed by Ramos-Gomez *et al.* in 1999 [11], we found some similarities and differences. Similarly, oral candidiasis and linear gingival erythema were commonly found in our study. These lesions are classified in the group 1, lesions commonly associated with paediatric HIV infection. On the contrary, hairy leukoplakia was the second most common lesion in our study while it was classified in the group 3, lesions strongly associated with HIV infection but rare in children. RAU was, however, rare in our study but classified in the group 1, HIV-associated ITP, found in only a child in our study, was not grouped in the classification at all, and was also reported in a study of Romanian HIV-infected children (4%) [18]. Further, we did not detect either lesions of herpes simplex virus (HSV) infection and parotid enlargement, lesions classified in the group 1 or lesions classified in the group 2, lesions less commonly associated with paediatric HIV infection such as periodontal diseases, other viral infections, and so on. These differences may be due to the geographic and ethnic



differences, different levels of immunosuppression, and receiving of ART of HIV-positive children in different studied groups [20].

When compared with the data of oral lesions in HIV-positive children in Asia mainly from Thailand, all studies including the present investigation pointed that oral candidiasis was the most common lesion [9,21]. Hairy leukoplakia, however, appeared to be more common in our study than in others. We also noticed the high prevalence of hairy leukoplakia in HIV-infected Thai adults in our previous study [4]. The differences between our study and a study by Khongkuntian *et al.* [9] about the prevalence of hairy leukoplakia may be due to the fact that ART was less available in our study (12.5%) than their study (33.3%) and some HIV-positive infants in their study especially with the age under 18 months may be actually uninfected HIV-exposed infants since only serologic diagnostic methods used in their study may only represent transplacental antibodies transmitted to children during pregnancy [10]. In fact, the use of virologic assays including HIV DNA PCR and HIV RNA detection methods and culture can define and rule out infection in infants less than 18 months of age.

Collectively, geographic and ethnic differences, different levels of immunosuppression, and availability of ART and antifungal prophylaxis may play a role in variations of the prevalence of some oral lesions in HIV-infected children. Therefore, a classification of HIV-related orofacial lesions may need revising or modifying in accordance with geographic and ethnic differences of patients. Further, more studies in Thai HIV-infected children in association with the predictive values, such as CD4 counts or viral loads, of the most common or specific oral lesions are needed.

In conclusion, dental caries status and oral lesions were relatively high and lack of ART was apparent in this present study. Therefore, treatment and prevention for dental caries and oral lesions and the availability of ART to HIV-infected children were demanded.

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