THE OCCURRENCE OF ORAL MANIFESTATIONS IN HIV INFECTED PATIENTS AT PUMWANI MATERNITY HOSPITAL, NAIROBI, KENYA

A thesis in part fulfillment for the Degree of Master of Public Health (M.P.H.) of the University of Nairobi.

By

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DECLARATION

I certify that this thesis is my own original work and has not been presented for a Degree in any other University.

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SUMMARY

The study involved 160 patients attending the ante-natal clinic of Pumwani Maternity Hospital between February and April, 1990. Of these 80 (50%) were confirmed to be HIV infected (referred to as cases) and the other 80 (50%) were not (referred as controls). In the cases, 60(75%) and in the controls, 59(73.8%) were between the ages 20-28 years.

The only risk behaviour for HIV infection appeared to be heterosexual contact. With the controls,71(88.8%) were married whereas 8(10%) were single. With the cases, 65(81.25%) were married and 15(18.75%) were single. They were predominantly of low social-economic status.Only 3(3.80%) of the controls, and 1(1.25%) of the cases,had attained A-level(form six) education and above. Out of the 160 examined,there was only one graduate. All patients examined were in group 2 i.e asymptomatic infection, according to Centres for Disease Control classification.

The number of controls with oral candidiasis was 22 (27.5%) compared to 50 (62.5%) in the cases(P=0.0003). A total of 14(17.5%) of the controls had bacterial infections i.e. gingivitis and periodontitis, whereas 42 (52.5%) of the cases had similar infections(P=0.0001). Eighteen (22.5%) of the controls had hyperpigmentation of the oral cavity mucosa compared to 38 (47.5%) of the cases(P=0.0016). There were five(6.3%) of the cases who had herpetic stomatitis and non in the controls, whereas there were eight(10.2%) of the cases with hairy leukoplakia-like lesions and two(2.5%) of the controls had similar lesions(P=0.0141). There were

15 (18.8%) of the cases who had lesions with clinical features of kaposi's sarcoma but this was not confirmed histologically. Two individuals in the control had such lesions also(P=0.0021). These lesions were predominantly in the palate. A few of the individuals in the study were involved in habits which are known to have an effect in the oral cavity but the numbers were too small to be of any statistical importance. For example, twelve individuals(four controls and eight cases) admitted that they drink alcohol, three cases were mirra chewers, two cases were smokers and one control was using unspecified drugs habitually. There were no cases of aphthous ulcerations but two controls and one case had xerostomia.

Oral Candidiasis, Periodontal Disease(Gingivitis and Periodontitis) and Hyperpigmentation were all associated with asymptomatic HIV infection.

LIST OF ABBREVIATIONS

AIDS - Acquired Immune Deficiency Syndrome

HIV - Human Immunodeficiency Virus

ARC - AIDS- related complex

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INTRODUCTION AND LITERATURE REVIEW

The acquired immunodeficiency syndrome (AIDS) has been recognized as a global health problem(1,26). Cases have been reported in most countries with the U.S.A. carrying the majority of them. It is estimated that five to ten million people worldwide have been infected with the causative agent referred to as human immunodeficiency virus (HIV)(26). In Kenya it is estimated that over 200,000 individuals have been infected and of these 6,000 have developed AIDS. As many as 10 to 30% of HIV infected individuals may develop AIDS within the next 5 to 10 years. According to Schiodt(5) a number of factors have characterized this epidemic and made it one of the greatest challenges in medicine:short doubling time ,always fatal, long incubation period (up to seven years) and absence of effective treatment. Therefore with the present lack of curative therapy or vaccine, this disease ranks as the most serious epidemic of our times. In some parts of the world e.g Manhattan and San Francisco, it has become the leading cause of death in men aged 25-44 years old(5).

The term Acquired Immune Deficiency Syndrome (AIDS) was first used in 1981 in the USA to describe the condition in a number of previously healthy young homosexuals who presented with severe opportunistic infection(s) and or Kaposi's Sarcoma which was indicative of a deficiency in cellular immunity(27,28,29). In 1983 clinicians in Brussels and Paris described AIDS in African patients of Central African Origin(30). Obel et al(31) and Okello(32) reported the first cases in Kenya in 1984.

The Human Immunodeficiency Virus (HIV) previously known as Human Lymphotropic Virus (HTLV III), lymphadenopathy associated virus (LAV) OR AIDS associated virus (ARV) was identified as the causative agent for AIDS by workers in U.S.A. and France (33,34,35). The virus is a human retrovirus characterized by the enzyme reverse transcriptase which converts viral RNA into a double stranded DNA(1).

The HIV virus preferentially infects the cluster differentiation(CD4 or T4) subset of the lymphocytes. There is evidence that CD4 antigen expressed on the T helper/inducer lymphocyte is the receptor for HIV virus. Due to the tropism for the CD4 (T4 cells) and its cytopathic effect there is absolute reduction of CD4 to CD8 ratio. The CD4 lymphocyte is a central figure in the immune response intimately involved with monocytes, macrophages, cytotoxic T cells, natural killer cells and B cells in modulating its immune response(37,35,39,42).

There are also cellular defects in the lymphocytes which include decreased blast transformation to mitogens and antigens, (38,42) decreased lymphokine production(37,39,42), diminished cytotoxic response(39) and depressed initiator of B cell immunoglobulin production(39,42).

The B cells in AIDS patients are polyclonally activated and this is depicted as raised level of total immunoglobulins predominantly 1gG and 1gA(40). Since B cells are actively proliferating, they are incapable of responding to signals that normally trigger them hence the frequent occurrence of pyogenic

infections(40).

Monocytes and macrophages are also infected and this leads to defective chemotaxis and extracellular killing(41). Infection of the neural cells leads to neurological symptoms which are witnessed at certain stages of HIV infection. In addition to T and B cell abnormalities, substances capable of suppressing the in vitro immune response have been found in serum of AIDS patients(43). Therefore the two major effects of HIV infection are, a decrease in number of helper cells and functional impairment of the lymphocytes(1). Due to all these changes, the individual may experience clinical symptoms similar to those which occur during an acute viral infection e.g. fever, sweats, malaise, enlarged lymph nodes, macular erythematous rashes of the trunk etc. As the immune suppression progresses, opportunistic infections e.g. candidiasis and others set in(1). The stage at which these lesions appear in the oral cavity is important to ascertain since they can be used as a marker for HIV infection.

HIV is transmissible in human beings. Initially homosexual sex was regarded as the major route of transmission. But recent data shows that heterosexual sex and bisexual sex are also important route of transmission(44). In studies conducted among African AIDS patients heterosexual sex was found to be the major route of transmission. Furthermore these cases tended to be more promiscuous as compared to the unaffected.

Transmission can also occur through transfusion of whole blood(46), its products(47), or through contaminated needles as in

the intravenous drug abusers. Vertical transmission has also been reported(48). Less established routes of transmission are thought to include scarification and traditional healers.

A lot of speculation has been raised as to whether HIV is transmitted through saliva. Studies so far carried out have not enlisted any evidence to this effect despite the fact that it has been isolated from saliva. Greenspan et al (1) isolated HIV from lymphocytes in peripheral blood, bone marrow cells, cell-free plasma, semen, urine, breastmilk, tears, saliva, vaginal secretions, lymph nodes, spinal fluid and brain tissue of patients with HIV infection. Groopman et al(63) isolated HIV virus from four of ten ARC patients and four of the healthy homosexual seropositive men but not from four AIDS patients and two healthy homosexual seronegative men. Ho et al(64) in a study of 83 saliva specimens from HIV infected patients had only one(1%) specimen which was positive for HIV, but 28 of 50 blood cultures(56%) from the same patients yielded the virus. In another study, Evans et al(65) isolated HIV from 7 out of 34 saliva specimens(21%) from AIDS patients, but culture from cell-free plasma and semen samples from the same patients were positive in 36 out of 68 cases(53%). Friedland et al(66) indicated that there was lack of evidence for transmission of AIDS to family members of AIDS patients who have shared household utensils.

Whereas the preceding studies cast a lot of doubt as to whether HIV is transmitted through saliva, they offer no explanation as to why this is the case. They have only shown that

the virus is in small quantities in saliva. Whether these quantities are not sufficient for transmission or there is another factor which prevents transmission does not come out clearly from these studies. One possible explanation could be that saliva has an inhibitory effect on the virus. Further investigation in this area is necessary.

Once the individual is infected with HIV, he forms antibodies against the virus i.e. he becomes seropositive. Unlike other viral infections, in AIDS the antibodies formed are not neutralizing and they do not inactivate the virus to give the individual immunity as in others. Hence detection of the antibodies can be used as a test for actual HIV infection. Infection may not lead to pathological changes immediately. Hence the "healthy seropositives" have the virus latent in T helper cells but some mechanisms prevent it from exerting its harmful biological effects.

But, some researchers have noted that oral lesions occur in both the asymptomatic and the symptomatic HIV infected patients. It therefore means that oral lesions may indicate the HIV status of an individual(3,5).

This is crucial in that many patients who are healthy looking could be highly infective and yet the dental or medical personnel could be totally ignorant of this fact(2). This may pose a problem to the health personnel who may be exposed to the body fluids e.g blood. Therefore a knowledge of the prevalent oral lesions in a given population will assist the health personnel in screening patients for definitive diagnosis. Various researchers have

analyzed the various oral lesions which are commonly found in HIV infected patients in various communities and groups. Their findings are presented in the following table:

Table 1: Distribution of oral lesions as shown in various studies, expressed as %

	Ks	Oral	Hl.	Gs.	Adv. ps	ANUG	Xeros	Herpes simplex
Rosenbergy et al(57)	34	49	-	-	-	-	-	-
Marcusen et al(58)	35	31	-	-	-	-	-	-
Silverman & Others(9)	45	70	23	-	19	-	13	77
Barr & Torosian(59)	20	94	0	-	-	-	-	-
Schiodt & Others(60)	-	-	46	-	-	-	10	-
Roberts & Others(6)	38	29	1	51	23	7	7	2
Silverman(2)	80	-	-	-	-	-	-	-
Casariego & Others(10)	-	64.1	18	8.5	8.5	-	0.9	-
Mugaruka & Others(11)	5	62	-	-	-	4	-	4
Wanzala & etal(13,15)	-	13.2	-	-	-	-	-	-
Doeld & Others(17)	40	-	-	-	-	-	-	-
De Wit & Others(21)	3	22	7.1	-	5.9	-	-	2.1

Key: KS=Kaposi's sarcoma, Oral=Oral candidiasis, HL=Hairy

leukoplakia, GS=Gingivitis, Adv. Ps=Advanced periodontitis, ANUG=Acute necrotizing gingivitis, Xeros=Xerostomia.

These lesions have been found at various stages of the HIV infection(12).

Kaposi's Sarcoma has been reported in as low as 3% of the patients studied to as high as 80%. The majority of these studies report between 20-45%. Oral candidiasis has been reported between 13.2 to 94% with the majority being reported between 20 and 70%. With Hairy Leukoplakia, the range is from 0 bout 50%. The two studies which reported generalized gingivitis have figures of 8.5% and 51%. Advanced periodontitis was reported in four studies with figures ranging between 5.9 and 23%. The incidence of ANUG was very low in the two studies that reported it. One had 4% and the other had 7%. Herpes simplex had also a very wide range i.e. from 2% to 77%.

The main weakness with all these data is that the authors do not indicate the disease stage of the individuals who were under study.

All these variations in the various studies point to the fact that there could be many other underlying factors that determine the kind of opportunistic infections that plague an HIV infected individual. One of these factors is the disease stage of the various individuals covered by the study. However more research will be required to identify these factors.

Oral lesions in HIV infected patients have been noted by many

researchers(1-26). They could be due to an alteration of the immune system. Several of these researchers have indicated that the oral lesions may be the first signs of HIV infection. Goodwin et al(3) in their review on some of the most common systemic signs and symptoms and oral manifestations of HIV infection and AIDS,noted that oral candidiasis is the most common and often the earliest oral manifestation of immunodeficiency due to HIV infection. He further adds that the development of oral candidiasis often precedes the diagnosis of AIDS. He indicates that the most common form of candidiasis associated with HIV infection and AIDS is the pseudomembranous type. Schiodt et al(5) has made similar observations. He notes that oral candidiasis among risk groups may be of predictive value for the subsequent development of full-blown AIDS. He further clarifies a major point on oral candidiasis by noting that the pseudomembranous type (thrush) is the form which is mentioned in many reports which don't indicate the type of candidiasis (this type is characterized by white removable plaque on a red or normal colored mucosa in any area of the oral cavity). He further notes that the atrophic type(erythematous)is also prevalent in all the known stages of HIV infection(This type is characterized by erythema in the palate usually without white plaques and on the dorsum of the tongue associated with loss of papillae. However Swett et al (4) in his review of literature while agreeing with Goodwin, indicates that other oral lesions varying from non-specific to neoplasms may present during the cause of AIDS. He also further notes that many of the oral conditions may

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be the first evidence of the underlying syndrome. He indicates that oral candidiasis occurs in about 75% of both ARC and AIDS patients. He therefore recommends that if oral candidiasis seen in an otherwise healthy patient responds to treatment but recurs or does not respond to treatment, further investigation may be warranted to determine if the patient is seropositive. Syrjanen et al(62) in a study of 66 Finnish homosexual men emphasizes further the importance of oral candidiasis by noting that the occurrence of oral candidiasis in a healthy adult without predisposing factors such as recent medication, should be regarded as suggestive of immunosuppression. He further adds that the occurrence of oral candidiasis among patients with full-blown AIDS has been described in conditions preceding the manifest syndrome as a sign indicating a poor prognosis. Of the 14 HIV-positive men in his study, thirteen 13 or(93%) had clinical signs suggestive of candidiasis which were verified by cultivation. He makes another important observation that recurrent milder infections of the skin and the mucous membrane caused by different viral and fungal pathogens are present in less severe forms of HIV infection. But he states that oral candidiasis, on the other hand, is a common finding in both congenital and other forms of acquired immunodeficiency syndrome. Thus he notes that oral candidiasis could be considered to be an early sign of immunosuppression in HIV infection. But he stresses the fact that Candida albicans organism occurs as commensals in the mouths of most healthy persons. While he agrees that there was a clear correlation between candidiasis and HIV infection, he

nevertheless notes that candidiasis was observed in 50%of HIV-negative men in whom the only predisposing factor was cigarette smoking. He also notes that in the general population, the majority of the mild cases of oral candidiasis are related to factors other than HIV infection. These factors include cigarette smoking in addition to the taking of a recent immunosuppressive or chemotherapeutic medication. Silverman(2) while agreeing with Syrjanen, notes that in the general population, asymptomatic carriers of candida albicans is approximately 40%. This, he says, could be due to antibiotic usage, diabetes, xerostomia, unclean dentures or leucopenia. But he adds that in the absence of any known cause for chronic candida infection,then immunosuppression must be considered. Roberts et al(6) in his study of 84 AIDS patients referred to the National Institute of Dental Research(NIDR), USA notes that oral candida infection has been suggested as a marker for esophageal candidiasis,which is an indicator of disease. This group was largely comprised of homosexual males.

Most of these studies do not indicate the stage of disease progression at examination. They are also mostly prevalent studies, i.e with no controls. Therefore it is not possible to show whether the lesions studied have any predilection to HIV infection. It should also be noted that all these figures quoted from the various studies are influenced by the population which was studied. This in part explains the noted differences. There is also the question of inter-examiner variability and the diagnostic criteria applied in

each of the studies.

The most notable oral lesion in HIV infection is candidiasis. Others are hairy leukoplakia, precocious periodontal disease, xerostomia and oral warts. Preliminary studies in Kenya tend to agree with this kind of picture(13,15). But these other lesions have not been noted to be as common as oral candidiasis.

As already mentioned, there is no any effective treatment for HIV infection so far. Whatever treatment has been tried has only offered temporary relief with the condition worsening thereafter. Could be that part of the reason why some of these medication are not that effective is because they are administered when the condition is in advanced stage. There is need therefore to diagnose the condition at its earliest in order to increase the chance of success of some of these ant-HIV drugs e.g Azidothymidine(AZT or zidovudine),Kemron, Ribaviran, Rifabutin, etc.

From the above analysis, it is therefore necessary to come up with specific oral indicators in our population which can be utilized in the diagnosis of HIV infection at its earliest stage in order to enhance the effectiveness of these drugs. It will also enable the dental personnel to protect themselves against HIV since high-risk patients either knowingly or unsuspectingly are being treated in dental offices.

This therefore makes the oral cavity a very important area in regard to HIV infection. The importance of the oral cavity has always been appreciated because various other systemic diseases do have oral manifestations. Also due to a rapid increase of dental

conditions in our community, the oral cavity is now constantly examined and treated. If therefore a diagnostic criteria is developed for HIV infection, it will become a very useful tool in the diagnosis, management and referral of HIV infected patients. Such a diagnostic criteria if confirmed will meet a felt need i.e. the need for an affordable and available diagnostic procedure in the absence of the more sophisticated and less affordable diagnostic kits which are presently available for detection of HIV infection. The criteria can be used everywhere most probably by most of the health personnel.

Aims and Objectives

General Objective

To assess the nature and occurrence of oral lesions in HIV infected persons with a view of utilizing them as diagnostic criteria for HIV infection.

Specific Objectives

1. To establish the type of oral lesions that occur in HIV infected patients.

2. To establish the specificity, sensitivity and predictive value of these lesions for HIV infection.

Materials and Methods

Between February and April 1990 inclusive, 160 patients attending the Ante-natal clinic of Pumwani Maternity Hospital were examined. The HIV status of these patients had already been determined by taking blood from them for testing after delivery. The HIV status was tested by ELISA and confirmed by Western blot. The group which was examined forms part of a cohort group which has been under study since 1986. Since January, 1986 many mothers who deliver at Pumwani Maternity Hospital have had their blood tested for HIV infection. All these mothers were invited to join the study group voluntarily. About 450(40%) of all those who had had their HIV status determined, have since joined the study, and about 180(40%) of this group are HIV-positive. These 450 patients are out of those who had been routinely tested for HIV infection soon after they had delivered. This particular group consented to be included in a cohort study which has been going on at Pumwani Antenatal Clinic since January 1986.

Medicolegal (Ethical Considerations)

Permission was sought and granted by the National AIDS Control Program Secretariat. Only patients who gave informed consent were included in the study. All patients received pre and post test counselling.

Clinical Methods

Information was obtained by use of interview and questionnaire methodology by a trained assistant.

Each patient had a medical history taken and a physical examination carried out with emphasis on the oral cavity as shown in the questionnaire (See annex 1).

All patients were examined while sitting on a chair and facing an open window which was facing the direction of the sun. All examinations were done during the morning hours. Mouth mirrors were use for retraction and to increase visibility, whereas a plain probe was utilized to test whether the gingival tissues were normal or infected. A periodontal probe was used to measure periodontal pocket depth.

Both the examiner and the assistant were not aware of the status of the patients before examination. The HIV status was later checked and this information was used to group the patients into cases(HIV-positive) and controls(HIV-negative). Majority of those examined were asymptomatic.

Laboratory Methods:

In those individuals with oral lesions swabs were taken for the following investigations:

(a) Mycology

All the mycological work was carried out with the assistance

of a qualified mycologist.

The specimens were collected using moist serum swabs. The swabs were then inoculated directly into the sabourad media and kept in room temperature(24 degree celsius) for a minimum of 24 hours then observed for growth of colonies . Where there were colonies, Lactophenol Cotton Blue test was done. In this test a specimen from the colony was placed on a glass slide and lactophenol cotton blue was added and observed for yeast cells. A confirmatory test was carried out using the Germ Tube test(GTT). In this test a loopful of a yeast colony was inoculated in one ml amount of pooled human plasma in a bijou bottle and incubated in 37 degrees celsius for one hour. A direct wet preparation was made and observed under a microscope for characteristic germination of germ tubes or drum sticks of candida albicans. In those colonies where the GTT was negative, sugar fermentation and assimilation tests were done to determine the species. Candida pseudotropicalis and Candida tropicalis were isolated.

(b) Bacteriology

All the bacteriological work was carried out with the assistance of a qualified bacteriologist.

Using plain swabs, specimen were taken from oral lesions for bacteriological analysis. These specimen were inoculated into the Blood Agar and Mc Conkey Culture Medias. These were in turn incubated overnight and results read the following day.

The cultures were examined for the following bacteria - klebsiella pneumoniae, enterobacterium cloacae, escherichia coli. The colonies were examined both macroscopically and microscopically. Macroscopically they were examined for size, colour, plan elevation, surface,and effect on the medium around the colony.Also the effect of colonies on blood agar was examined. The non-haemolytic species cause no change, whereas the alpha haemolytic change it to greenish colour and the beta haemolytic cause complete discoloration. Microscopically, the colonies were examined using the Gram stain method where those which are gram- positive change colour to dark violet and those which are gram-negative change it to pink. Coagulate test was also done where in a positive test, a clot appears within a few hours. Oxidase test was done for Pseudomonas species, Neisseria species and Cholera vibrios. These give a positive purple colour when they come into contact with the oxidase reagent. The Catalase test was done to distinguish various microorganisms. Staphylococci and Micrococci give a positive test as they produce the enzyme catalase which acts on hydrogen peroxide, whereas streptococci gives a negative test, because it does not produce the enzyme catalase.

There were a few lesions which required histological examination but due to shortage of funds, it was not possible to conduct histological investigations on lesions like Kaposi's sarcoma, Hairy leukoplakia etc.

(c) Microscopy

Swabs were also taken and imprinted on slides for microscopic examination. These slides before examination were fixed and stained appropriately.

(d) Figures

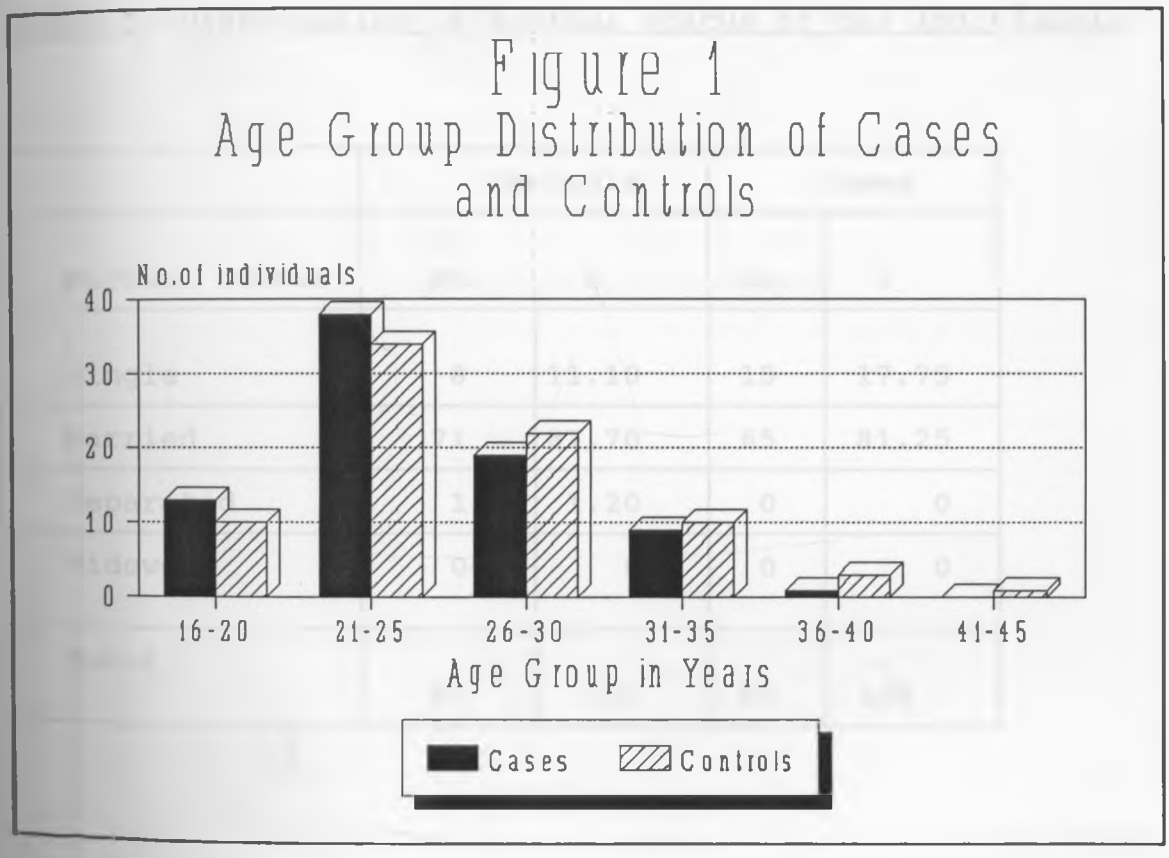
All lesions were photographed using on intra-oral camera and a flash.

RESULTS

A total of 160 individuals were studied. The age range was 18 years to 41 years. The mean age for controls was 26 years(sd=6.1) and for cases was 25 years(sd=5.3). (See Fig.1). There was no statistical difference between the two groups (P=0.18).

The following is the presentation of the results in form of tables and figures:

Figure 1
Age Group Distribution of Cases and Controls

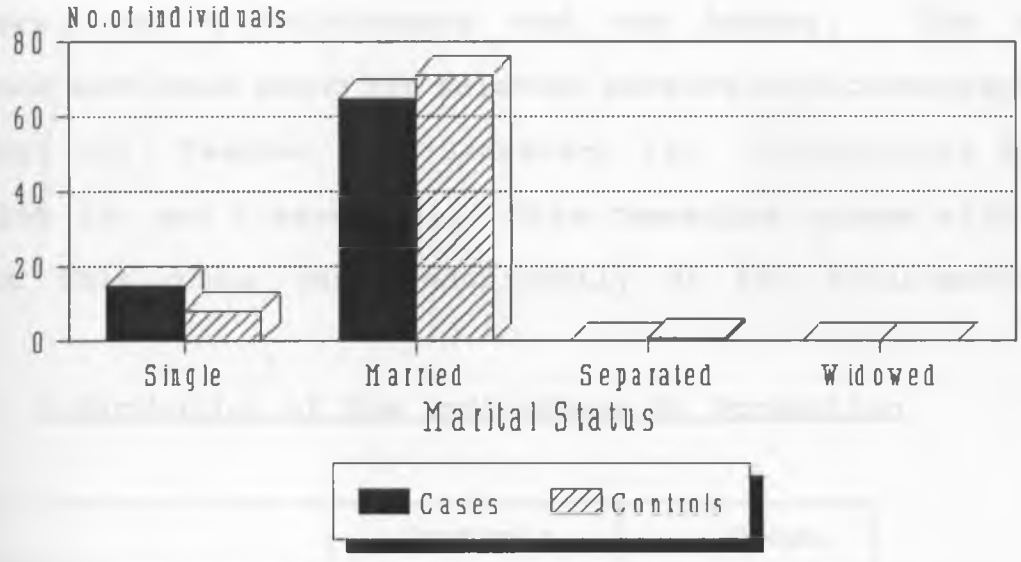


The marital status of the individuals is shown on Table 2 and Figure 2. Of the controls 71(88.8%) and 65(81%) of the cases indicated that they were married. Only one individual among the controls indicated that she was separated from her husband. Therefore there was no significant difference between the cases and the controls(P=0.15). In both groups the percentage of single mothers was below 20%.

Table 2: Distribution of Marital Status of the Individuals

	Controls		Cases	
Marital Status	No.	%	No.	%
Single	8	11.10	15	17.75
Married	71	87.70	65	81.25
Separated	1	1.20	0	0
Widowed	0	0	0	0
Total	80	100	80	100

Figure 2
Distribution of Marital Status of the Individuals



The occupation of the individuals is shown on table 3 and figure 3. In both groups unemployment was over 75%. For those who indicated that they do business, two stated that they are shopkeepers, one a hairdresser and one hawker. The main occupations mentioned among the salaried workers were cartographer, House- girl (3), Teacher (4), Secretary (2), Subordinate Staff (1), Tailor (9) and Cleaner (1). This therefore agrees with the view that this group was predominantly of low socio-economic status.

Table 3: Distribution of the Individuals by Occupation

	Controls		Cases	
Occupation	No.	%	No.	%
Business	8	8.9	6	7.7
Salaried Worker	12	15.2	11	12.8
Jobless	60	75.9	63	79.5
TOTAL	80	100	80	100

Both in the controls 60 (75.9%) and in the cases 63 (78.8%) the majority of the individuals indicated that they were jobless i.e they were neither salaried workers nor were they business women. However the majority of these jobless women, 71(88.8%) among the controls and 62(77.5%) of the cases were housewives.

Figure 3
Distribution of the Individuals by Occupation

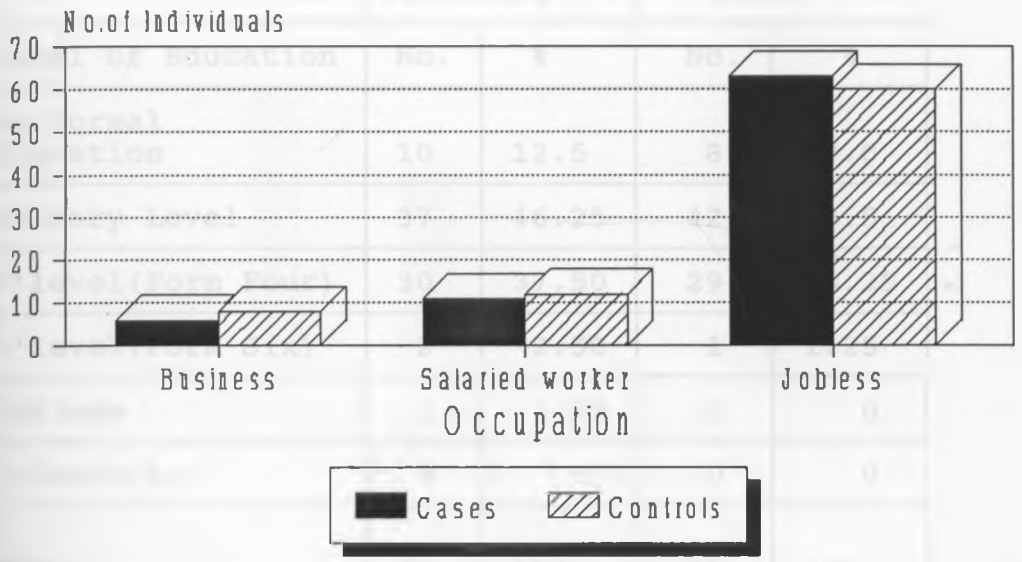
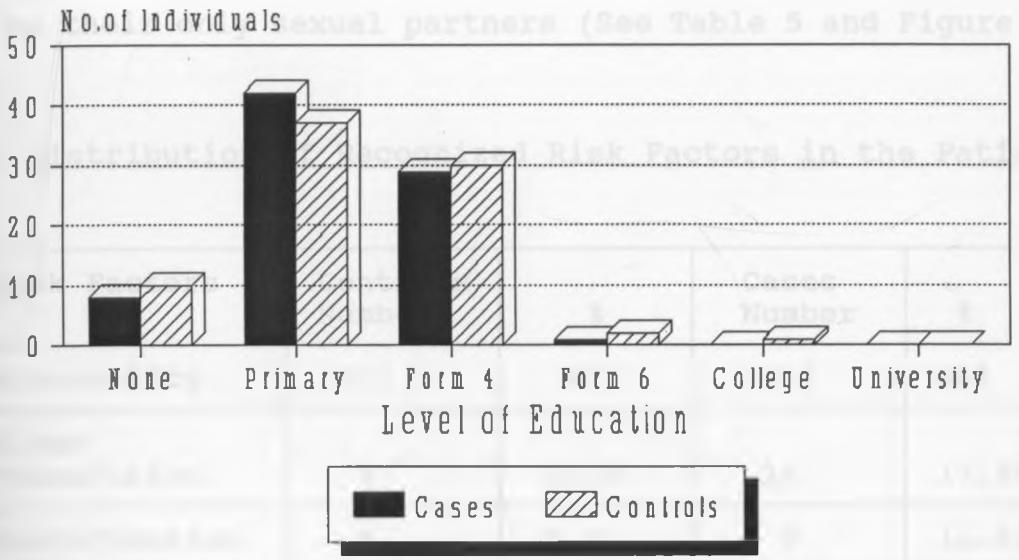


Table 4: Distribution of Individuals' Level of Education

	Controls		Cases	
Level of Education	No.	%	No.	%
No formal Education	10	12.5	8	10.0
Primary Level	37	46.25	42	52.5
O'level(Form Four)	30	37.50	29	36.25
A'level(Form Six)	2	2.50	1	1.25
College	1	1.25	0	0
University	0	0	0	0
TOTAL	80	100	80	100

The percentages between the controls and cases were comparable but the differences were insignificant. In both groups a greater number of the individuals were of low educational qualifications. Over 95%of both the cases and controls had educational achievements below ordinary("o") level.

Figure 4
Distribution of Individuals' Level of Education



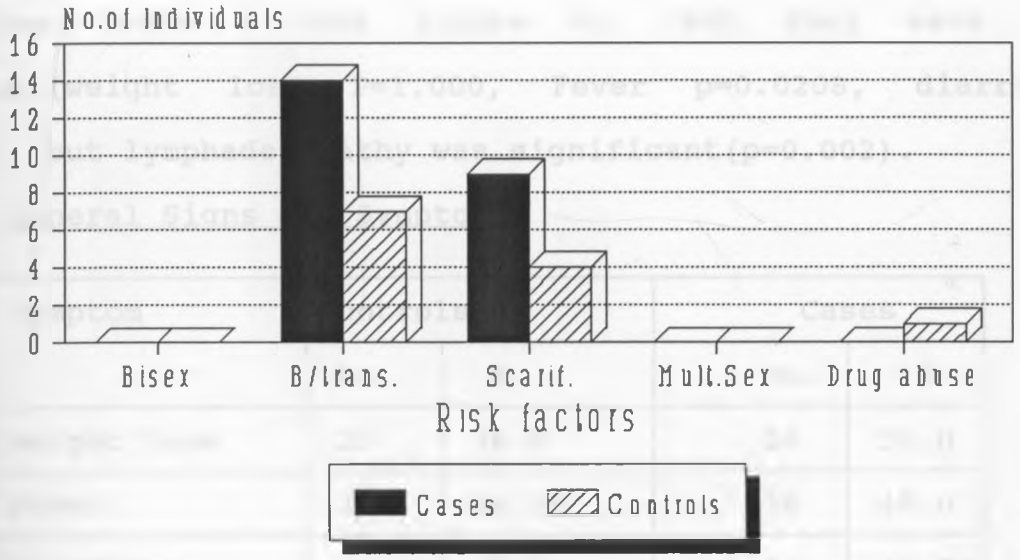
Individuals with recognized risk factors e.g. bisexuals, intravenous drug users, prostitutes were not found in this group. Most of the individuals as already indicated claimed to have their husbands as their only sexual partners (See Table 5 and Figure 5).

Table 5: Distribution of Recognized Risk Factors in the Patients

Risk Factors	Controls Number	%	Cases Number	%
Bisexuality	Nil	Nil	Nil	Nil
Blood Transfusion	7	8.75	14	17.50
Scarification	4	5.0	9	11.25
Sex with Multiple Sexual Partner	Nil	Nil	Nil	Nil
Intravenous Drug Abuse	1	1.25	Nil	Nil

From the above table and the figure below, heterosexual contact will appear to be the major cause of HIV infection,assuming that there are no any other unknown causative factors of importance.

Figure 5
Distribution of Recognized Risk factors in the Individuals



The major general signs and symptoms as gathered from interviewing patients were weight loss 23(28.8%), fever 21(26.3%), diarrhoea 4(5%) and lymphadenopathy 1(1.2%) among the controls and 24(30%), 36(45%), 13(16.3%) and 15(18.8%) respectively among the cases (See Table 6 and Figure 6). But they were not significant(weight loss P=1.000, Fever p=0.0208, diarrhoea p=0.0401), but lymphadenopathy was significant(p=0.002).

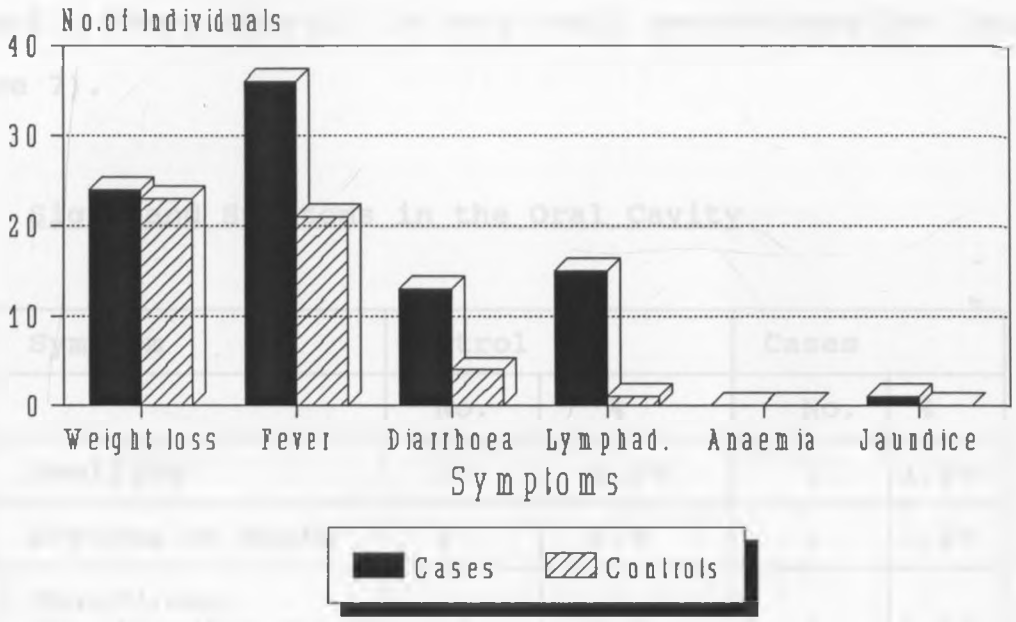
Table 6: General Signs and Symptoms

Symptom	Controls		Cases	
	No	%	No.	%
Weight Loss	23	38.8	24	30.0
Fever	21	26.25	36	45.0
Diarrhoea	4	5.0	13	16.25
Lymphadenopathy	1	1.25	15	18.75
Anaemia	Nil	Nil	Nil	Nil
Jaundice	Nil	Nil	1	1.25

As already indicated elsewhere fever, diarrhoea and weight loss were not found to be significant. But lymphadenopathy had significant difference between controls and cases.

The information about these lesions was also subjective because it depended on the patient's ability to remember and also to relate the question to actual experience. For example, it was difficult to establish whether the patient lost as much weight as the question asked.

Figure 6
General Signs and Symptoms



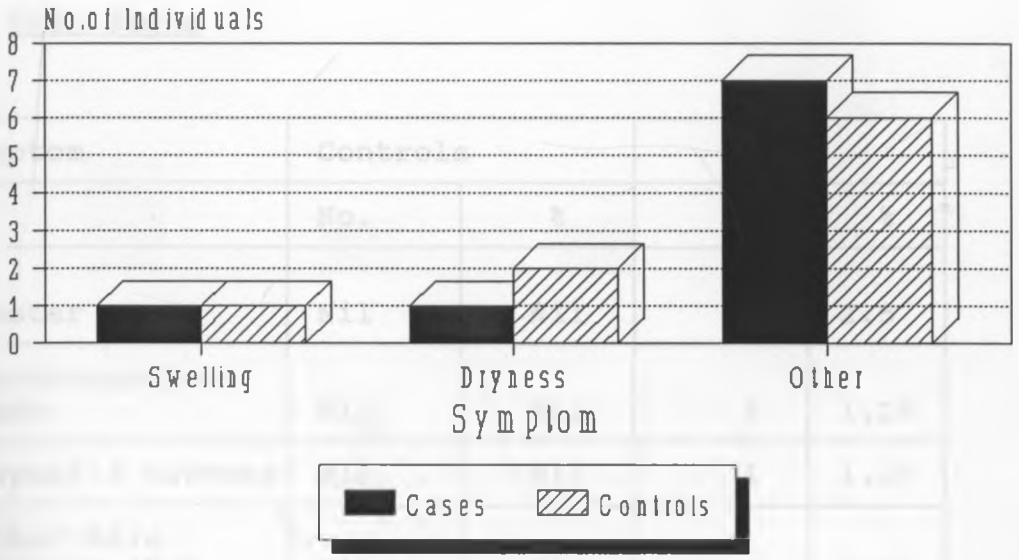
The notable signs and symptoms in the oral cavity were swellings, dryness of mouth (Xerostomia), pain or ulcer or bleeding or bad smell. These were all in very small percentages(See Table 7 and Figure 7).

Table 7: Signs and Symptoms in the Oral Cavity

Symptom	Control		Cases	
	No.	%	No.	%
Swelling	1	1.25	1	1.25
Dryness of Mouth	2	2.5	1	1.25
Pain/Ulcer/ Bleeding/Bad Smell	6	7.5	7	8.75

None of these signs and symptoms in the oral cavity were of any significant importance(p=0.1018).

Figure 7
Signs and Symptoms in the Oral cavity



No skin lesions were registered in the controls but a few were recorded in the cases e.g. maculopapular rash, Kaposi's Sarcoma and other unspecified skin lesions (See Table 8 and Figure 8).

Table 8: Skin Signs

Symptom	Controls		Cases	
	No.	%	No.	%
Zoster	Nil	Nil	2	2.5
Maculopapular Rash	Nil	Nil	1	1.25
Kaposi's Sarcoma	Nil	Nil	1	1.25
Other Skin Lesions (Not classified)	Nil	Nil	5	6.25

None of these skin lesions were of any significance($p>0.05$). But in relation to oral lesions, the absence of skin lesions, they are predominantly the only lesions seen in these patients at this stage. This may be significant in terms of disease diagnosis.

Figure 8
Skin Signs

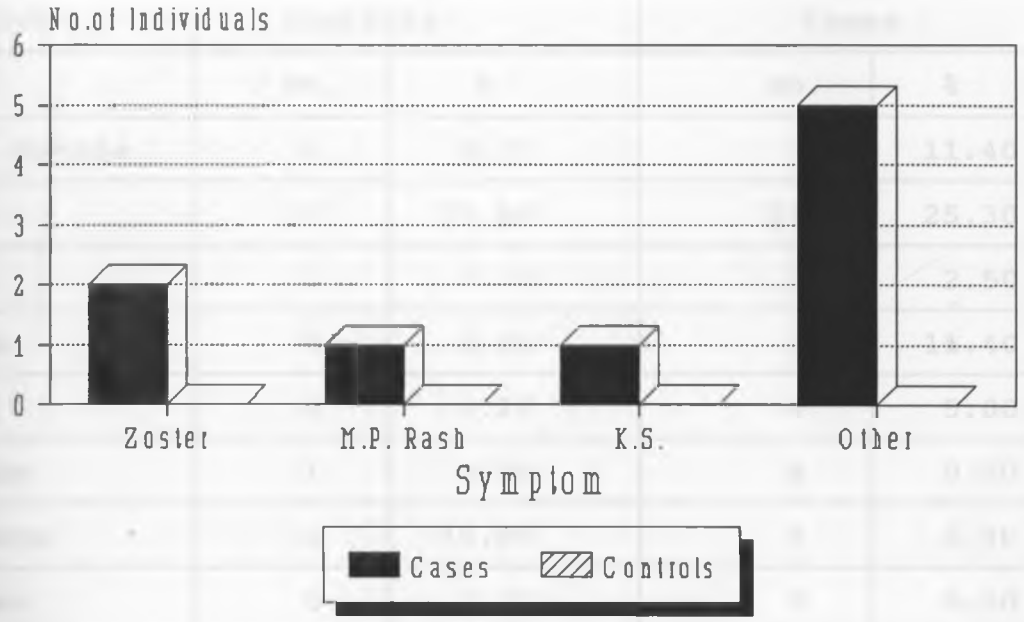
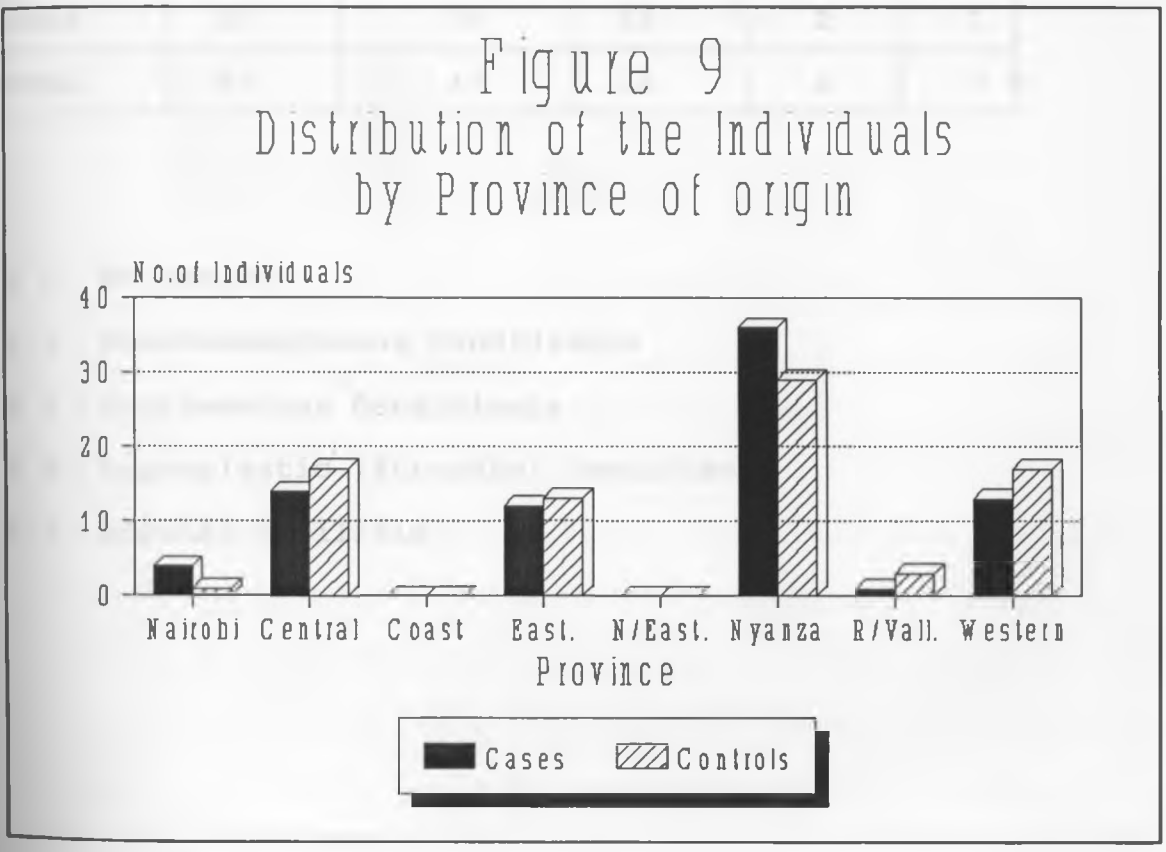


Table 9: Distribution of the individuals by District of Origin

District	Controls		Cases	
	No.	%	No.	%
South Nyanza	4	6.20	7	11.40
Siaya	16	19.80	21	25.30
Kisii	3	3.70	1	2.50
Kisumu	6	6.20	7	11.40
Busia	2	1.20	4	5.00
Bungoma	1	1.20	0	0.00
Kakamega	14	16.00	9	8.90
Turkana	0	1.20	0	0.00
E. Marakwet	0	1.20	0	0.00
Nandi	2	2.50	0	0.00
Nakuru	1	2.50	1	1.30
Nyeri	5	6.20	3	3.80
Muranga	5	6.20	7	7.60
Kiambu	7	11.10	4	5.00
Embu	0	0.00	1	1.30
Kitui	3	5.00	0	0.00
Machakos	10	7.40	11	12.70
Mombasa	0	1.20	0	0.00
Nairobi	1	1.20	4	3.80
TOTAL	80	100	80	100

Geographically, Nyanza had more cases (40) followed by Central (13) with Western and Eastern having same number (11). There were no cases reported from Coast Province. However the same geographical distribution was observed among the controls, so place of origin was not shown to be a risk factor to HIV infection. (See Table 9 and Figure 9).



The number of cases and controls per province were comparable as shown in the figure. They were not statistically significant (P=>0.05).

Table 10: Distribution of Oral Candidiasis

LESION

	0	1	2	3	4
Controls	58	14	5	2	1
Cases	30	36	11	2	1
TOTAL	90	47	14	2	2

Key:

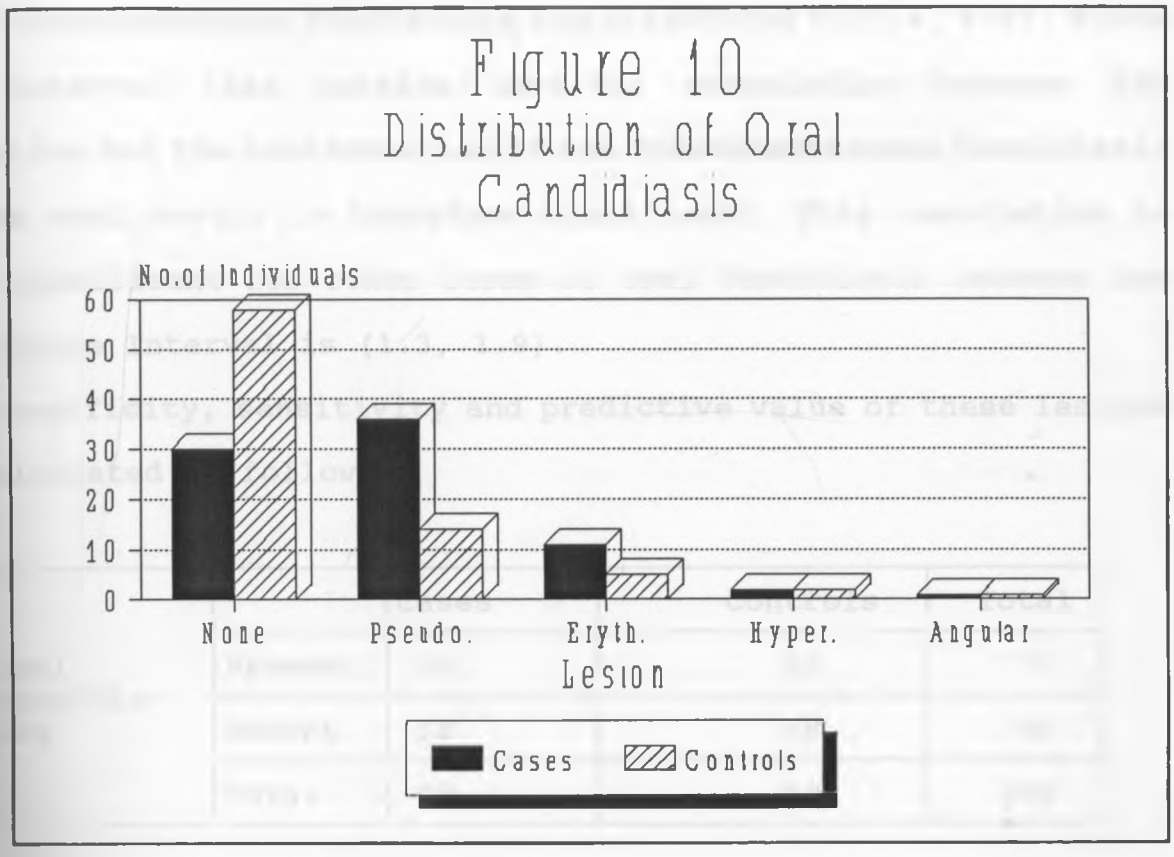
0 = No lesion

1 = Pseudomembranous Candidiasis

2 = Erythematous Candidiasis

3 = Hyperplastic (Atrophic) Candidiasis

4 = Angular Cheilitis



The Odds ratio for pseudomembranous Candidiasis was calculated to 4.4. Therefore an individual with this lesion is 4.4 times more likely to be HIV-positive than the one who does not have the lesion. The Odds ratio for any type of Candidiasis was calculated to 1.6. Therefore a person with any form of this lesion i.e. pseudomembranous, erythematous or hyperplastic, is 1.6 times more likely to be HIV-positive than one who does not have any of these lesions.

The chi-square was calculated to 26.4. From the above statistics it is therefore concluded that there is significant association between oral candidiasis and presence of HIV infection in an

individual (P<Value 0.0001). The 95% Test-based Confidence Interval for Pseudomembranous Candidiasis was calculated to(2.4, 8.0). Since the interval lies outside OR=1,the association between HIV infection and the manifestation of the Pseudomembranous Candidiasis in the oral cavity is therefore significant. This association is also significant for other forms of oral Candidiasis because the Confidence Interval is (1.3, 1.9).

The specificity, sensitivity and predictive value of these lesions is calculated as follows:

		Cases	Controls	Total
Oral Candidia-sis	Present	50	22	72
	Absent	30	58	88
	Total	80	80	160

Specificity = $\frac{\text{True Negatives x 100}}{\text{All those without disease}}$

= $\frac{58 \times 100}{80}$

= 72.5%

Sensitivity = $\frac{\text{True positives x 100}}{\text{All those with disease}}$

= $\frac{50 \times 100}{80}$

= 62.5%

Predictive Values

(a) Positive Predictive Value Pr(+ve)

$$P(+ve) = \frac{\text{True Positive}}{\text{All tested positive}}$$

Prevalence = 7.5% (from Blood Bank Records)

Therefore, $P(+ve) = \frac{\text{Prevalence x Sensitivity}}{PS + (1-P)(1-\text{Specificity})}$ P - prevalence S - Sensitivity

$$= \frac{0.075 \times 0.62}{(0.075 \times 0.62) + (1-0.075) \times (1-0.78)}$$

$$= \frac{0.0465}{0.0465 + 0.22(0.925)}$$

$$= \frac{0.0465}{0.25}$$

$$= 0.186 \text{ or } 18.6\%$$

Therefore, for every 100 individuals tested positive with this criteria, about 19 will have the disease (i.e. The ability of this screening test to pick out subjects in population with the disease.) For every 100 individuals who will test positive for HIV using this criteria,it is only 19 who will have the disease. Therefore the predictive value of this test is low and hence it can not be useful as a screening or a diagnostic criteria.

(b) Negative Predictive Value. Pv(-ve)

$$P(-ve) = \frac{\text{True negative}}{\text{All tested negative}}$$

$$= \frac{(1-P) \times \text{Specificity}}{(1-P) \times \text{Specificity} + P(1-\text{Sensitivity}}$$

$$= \frac{(1-0.075) \times 0.78}{(1-0.075) \times 0.78 + 0.075\ (1-0.62)}$$

$$= \frac{0.92 \times 0.78}{(0.925 \times 0.78) + 0.075\ (0.38)}$$

$$= \frac{0.7215}{0.75}$$

$$= 96\%$$

Therefore, for every 100 individuals tested negative with this criteria about 96 will not have the disease, (i.e. the ability of this screening test to leave out those without the disease or the likelihood that a person with a negative test does not have the disease).Therefore the test has a high negative predictive value. From mycological investigation the predominant microorganism isolated was candida albicans.

Table 11: Distribution of Oral Bacterial Infection

LESION

	0	1	3	4
Controls	65	13	3	0
Cases	37	29	11	1

Key: 0 = No Lesion

1 = Gingivitis

3 = Periodontitis

4 = Gingivitis + Periodontitis

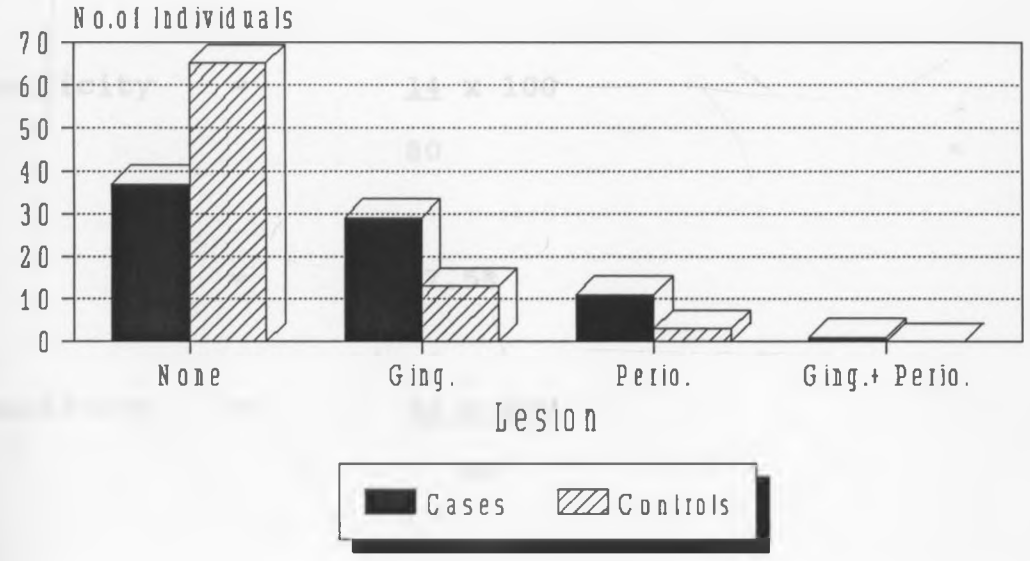
The Odds ratio for Gingivitis was calculated to 4.6 while that of periodontitis was 6.7. Therefore an individual with Gingivitis is 4.6 times and that with periodontitis is 6.7 times more likely to be HIV-positive than the one who does not have any of these lesions. A person with any of the bacterial infections has an Odds ratio of 5.2.

The X^2 was calculated to 19.3.

From the above values it is highly significant that there is an association between bacterial infection and the presence of HIV infection in an individual (P-value 0.0002). The 95% Confidence Interval for Gingivitis is (2.5, 8.5), that of Periodontitis is (3.1, 14.3) and that of both lesions combined is (2.7, 10.1). Since these intervals lie outside OR=1, then the association between HIV

infection and the occurrence of these lesions in the oral cavity is significant.

Figure 11
Distribution of Oral Bacterial Infection



From the bacteriological analysis the bacteria isolated from patients with these lesions were staphylococci aureus, streptococci species, escherichia coli.

The specificity, sensitivity and predictive values of these lesions are as follows:

		Cases	Controls	Total
Bacterial Infections	Present	42	14	56
	Absent	38	66	104
	Total	80	80	160

$$\text{Specificity} = \frac{14}{80} \times 100$$

$$= 17.5\%$$

$$\text{Sensitivity} = \frac{42 \times 100}{80}$$

$$= 52.6\%$$

Predictive Values

(a) Positive Predictive Value (Pv(+ve)

$$Pv(+ve) = \frac{\text{Prevalence x Sensitivity}}{Ps + (1-P)(1-\text{Specificity})}$$

P=Prevalence

S=Sensitivity

$$= \frac{0.075 \times 0.526}{0.075(0.526) + 1-0.075(1-0.197)}$$

$$= \frac{0.03945}{0.03945 + (0.925 * 0.803)}$$

$$= \frac{0.03945}{0.782225}$$

$$= 0.05 \text{ or } 5\%$$

The positive predictive value indicates that for every 100 individuals tested positive with this screening test, about 5 will have the disease. It is therefore not useful as a screening test.

(b) Negative Predictive Value (Pv(-ve)

$$Pv(+ve) = \frac{(1-P) \times \text{Specificity}}{(1-P) \times \text{Specificity} + P(1-\text{Sensitivity})}$$

$$= \frac{(1-0.075) \times 0.197}{(1-0.075) \times 0.197 + 0.075\ (1-0.526)}$$

$$= \frac{0.925 \times 0.197}{0.925 \times 0.197 + 0.075\ (0.474)}$$

$$= \frac{0.182225}{0.217775}$$

$$= 0.84\% \text{ or } 84\%$$

The negative predictive value indicate that for every 100 individuals tested negative with this screening test, about 83 will not have the disease. Therefore this test has a high negative predictive value.

Table 12: Distribution of Viral Infections

LESION

	0	1	2	3
Controls	78	0	0	2
Cases	66	5	1	8

Key:

0 = No Lesion

1 = Herpetic Stomatitis (HSV induced)_

2 = Oral Zoster (VZV induced)

3 = Hairy leukoplakia (EBV induced)

The Odds Ratio (OR) was calculated to 8.3. Therefore, a person with any viral infection i.e. Herpetic Stomatitis, Oral Zoster or Hairy leukoplakia is 8.3 times more likely to be HIV-positive than one who does not have any of these lesions.

The chi-square was calculated to 9.6.

From the above figures, it shows that there is an association between viral infection especially Herpetic Stomatitis and Hairy Leukoplakia and HIV infection (P-value = 0.0083). The 95% Confidence Interval for Viral infections was calculated to (2.3, 29.5). Since these values lie outside OR=1, then the association between HIV infection and the presence of Viral infections in the oral cavity is significant.

But these results may be misleading because the numbers

involved are small and the diagnosis on these lesions was only done clinically. Laboratory confirmation was not possible.

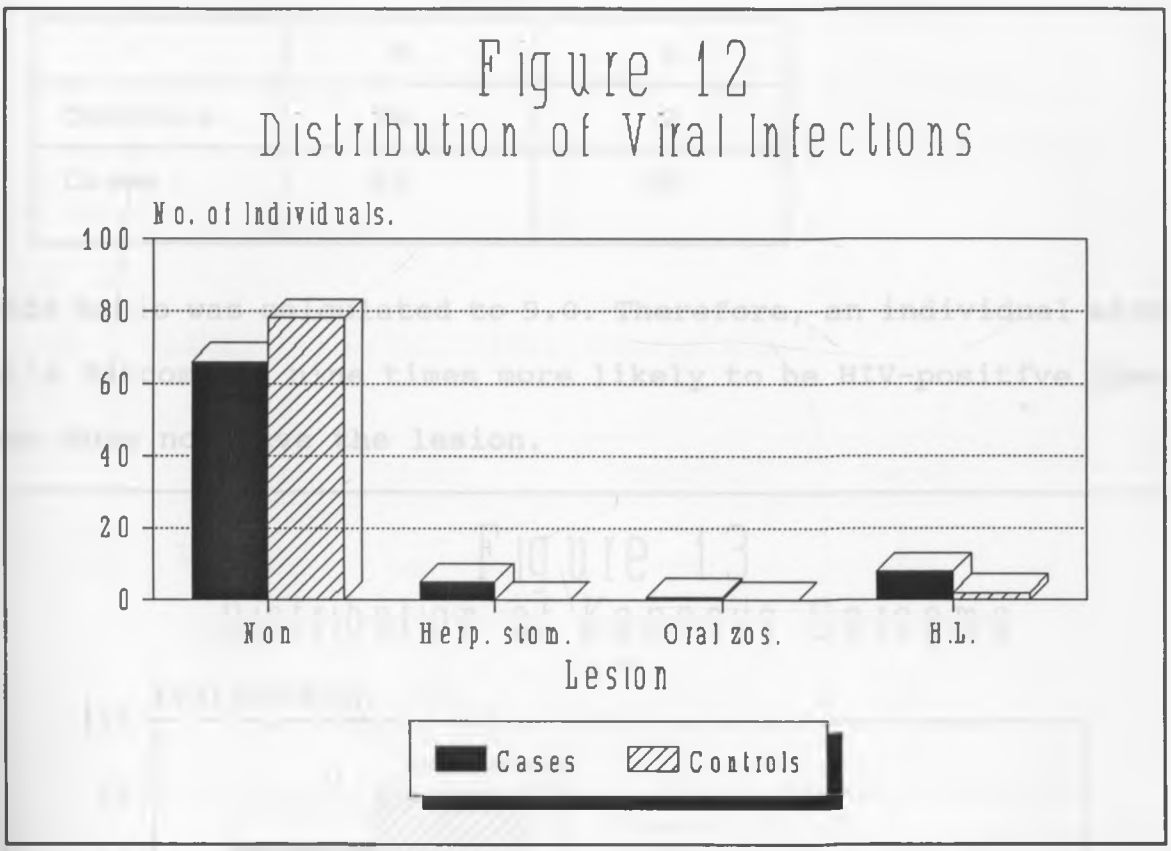
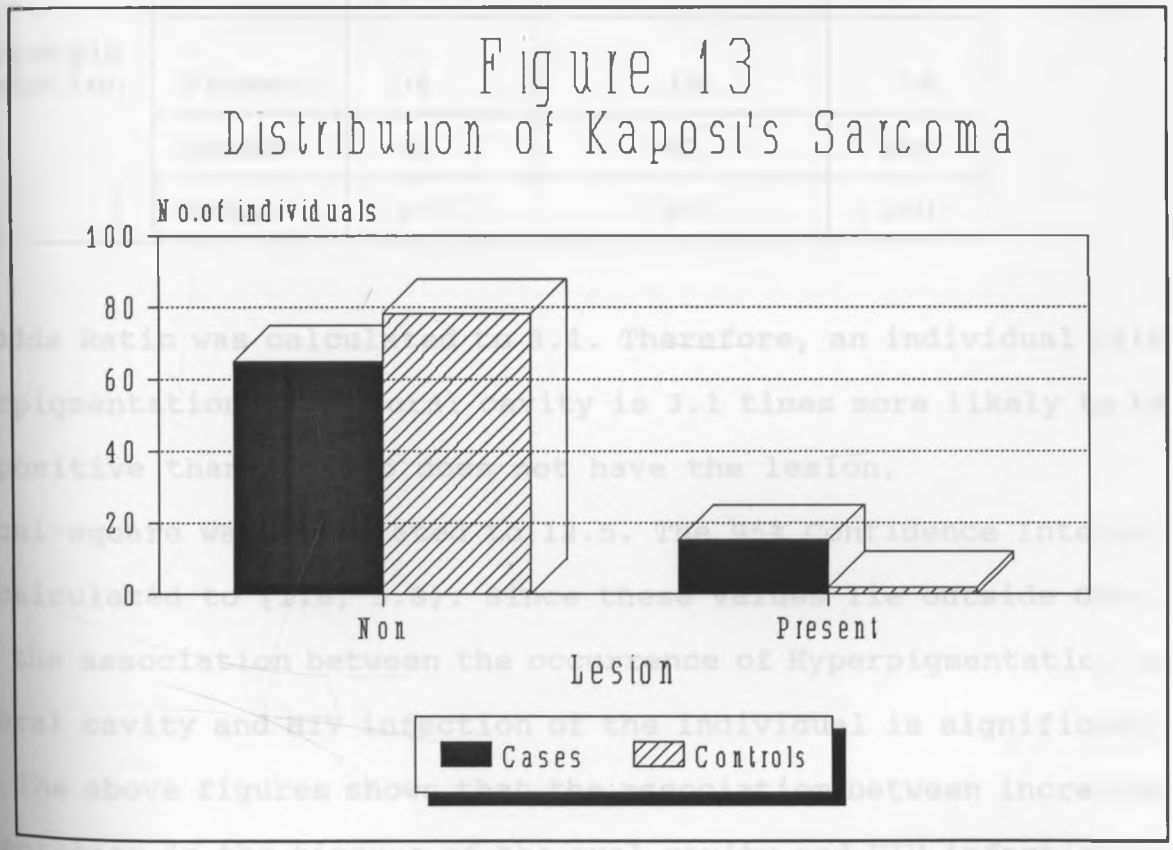


Table 13: Distribution of Kaposi's Sarcoma

	LESION	
	0	1
Controls	78	2
Cases	65	15

The Odds Ratio was calculated to 9.0. Therefore, an individual with Kaposi's Sarcoma is nine times more likely to be HIV-positive than one who does not have the lesion.



The chi-square was calculated to 7.6, with a P-value of 0.0059. The 95% Confidence Interval was calculated to (1.9, 41.9). Since these

values lie outside OR=1, then the association between the presence of Kaposi's sarcoma in the oral cavity and HIV infection of the individual, is significant.

Like in the case of viral infections, the significance of these figures cannot be ascertained because it was not possible to confirm these lesions histologically.

Table 14: Distribution of Hyperpigmentation

		Cases	Controls	Total
Hyperpig mentation	Present	38	18	56
	Absent	42	62	104
	Total	80	80	160

The Odds Ratio was calculated to 3.1. Therefore, an individual with Hyperpigmentation of the oral cavity is 3.1 times more likely to be HIV-positive than one who does not have the lesion.

The chi-square was calculated to 12.5. The 95% Confidence Interval was calculated to (1.6, 5.8). Since these values lie outside OR=1, then the association between the occurrence of Hyperpigmentation in the oral cavity and HIV infection of the individual is significant.

The above figures shows that the association between increased pigmentation in the tissues of the oral cavity and HIV infection is highly significant (P-value = 0.0004).

The main areas of the oral cavity involved in both the cases and controls were the palate, tongue, buccal mucosa, floor of the

mouth, lower lip and attached gingiva in that order.

Figure 14
Distribution of Hyperpigmentation

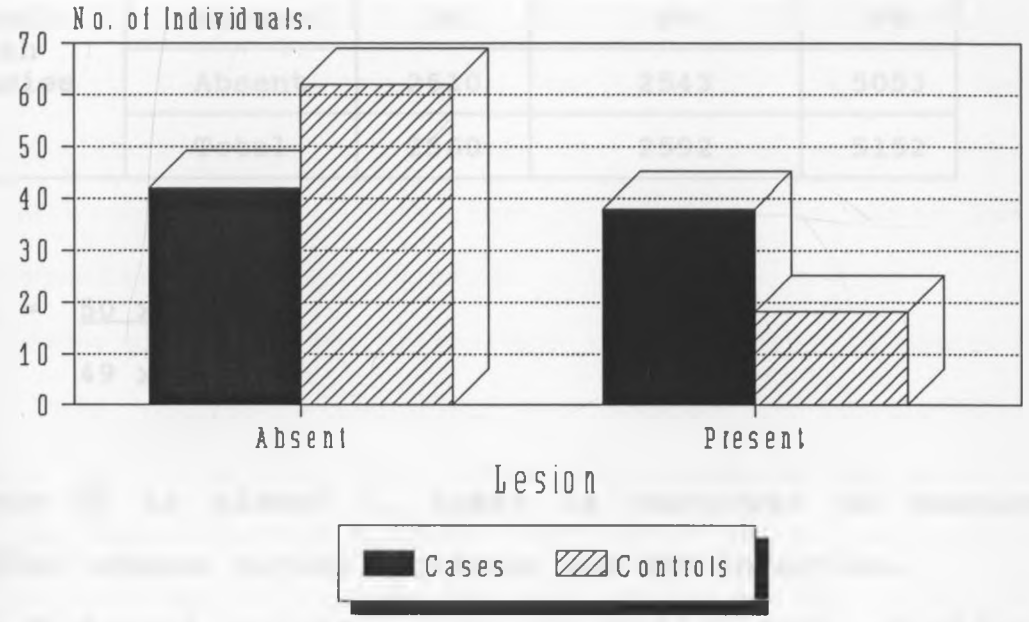


Table 15: Distribution of Caries

		Cases	Controls	Total
Teeth with Caries	Present	50	49	99
	Absent	2510	2543	5053
	Total	2560	2592	5152

$$OR = \frac{50 \times 2543}{49 \times 2560}$$

Since OR is almost 1, there is therefore no meaningful association between caries incidence and HIV infection.

The following variables were not statistically significant: hospitalization in the last two years(p=0.13), regular medication intake in the last one year(p=0.6), visit to a doctor or clinic in the last one year(p=0.1), blood transfusion(p=0.2), weight loss over 10% baseline(p=1.0), any other signs/ symptoms e.g. sensitivity, pain, ulcer, bleeding, bad smell, swelling, white parches and dryness of mouth(p=0.16), prolonged cough(p=0.40), jaundice(p=1.0), skin lesions e.g. zoster(p=0.5), macularpapular rash(p=1.0), kaposi's sarcoma(p=1.0), other skin lesions(p=0.06), caries(p=0.4),alcohol intake(p=0.2), miraa chewing(p=0.4), smoking(p=0.4) and drugs intake(p=1.0).

DISCUSSION

Between February to March 1990 one hundred and sixty patients were studied.

Due to the fact that this kind of study is very expensive, in some cases it was only possible to identify certain lesions clinically without histological back-up. Lesions such as Kaposi's sarcoma were rare. The information in relation to these lesions shall be treated with this in mind.

The mean age for both cases and controls was between 25-26 years. This agrees with what was found in Uganda(51) and Zaire(53). The study in Zaire showed that females had an earlier pick of HIV infection than males. This could possibly be due to an earlier start of sexual relations among females than in males.

Bisexually and intravenous drug abuse did not feature in this group. This is in contrast with studies in western countries where factors like homosexuality, bisexuality and intravenous drug abuse play a leading role in HIV transmission(27,28,29,37). Seven controls or 8.64% and thirteen or 16.25% cases claimed to have had blood transfusion. Since the number of cases is double that of controls, it is possible that blood transfusion may have played a role,but this is not significant(p=0.1346).

In this study, unlike what Amayo(30) found out, there was hardly any admission of promiscuity. Amayo studied 50 confirmed AIDS patients who had been admitted in the medical wards of the Kenyatta National Hospital between march to december 1987. But this

present study group comprised of women attending an antenatal clinic at Pumwani Martenity Hospital. So the differences observed between the two groups could be due to the fact that they belong to two different population groups.In the present study as well as in Amayo's study, the patients were of low socio-economic background. But in the Western World, AIDS has been diagnosed more in those in higher socio-economic status(31,56). Also Rwanda and Zaire reported patients from higher socio-economic status(52,53).

In our situation patients from higher socio-economic status, tend to go to private hospitals for treatment and so far, no study has been carried out to find the HIV status in this group. This discrepancy can only be settled by more research especially in relation to patients in private hospitals.

The majority of these individuals studied claim to be married and not to be involved in any extra-marital sex. Since majority again are jobless, it could be possible that they are either involved in some activities that make them HIV prone, or majority are not married and are involved with multiple sexual partners, or most of their husbands are infected, or there are other unknown factors that contribute to HIV infection. This require further investigation.

Various oral lesions were considered, namely candidiasis, gingivitis, acute necrotizing gingivitis, periodontitis, herpetic stomatitis, oral zoster, hairy leukoplakia, oral ulceration, Kaposi's Sarcoma, Caries and melanoma.

The most remarkable was oral candidiasis which was 61.5% in

cases. This compares with various studies. Rosenberg and others(57) reported 49%; silverman and others(9), 70%; Barr and Torosian(59) , 94%; Casariego and others(10), 64.1% and Mugaruka and others(11), 62%. But an earlier study in Kenya by Wanzala and others(13,15), reported 13.2%. The difference between the two studies is big enough to warrant further investigation to try and find out any other unknown factors. Possible areas could be the study populations. These two studies involved two different study population. In Wanzala's case, the study population was predominantly prostitutes. While in this study, the population consisted of mainly married, breast-feeding mothers. One common factor is that both studies involved females only. Another possible factor is that prostitutes are more conscious of their oral status and hence could take the first opportunity to eliminate any oral lesions. This study group was mainly made up of low socio-economic group, with over 60% being jobless. Definitely mouth care was not going to be their priority. The stress of pregnancy, childbirth and breast-feeding may also have had a bearing towards this high incidence of candidiasis especially among the HIV infected. The same arguments can be advanced for bacterial infections and pigmentation.

Not much can be said about Kaposi's Sarcoma because it was only diagnosed clinically. But several studies have noted percentages above 20 e.g. Rosenberg and others(57), 34%, Marcusen and others(58), 35%, Silverman and others(9), 45%; Silverman [illegible](2), 80%. Therefore a percentage of 22.8 in this study is likely

though not confirmed.

Very few cases of hairy leukoplakia were noted but again the lesions were not confirmed histologically for the reasons already mentioned.

There were no cases of generalized gingivitis. Only mild forms of gingivitis were seen and were localized. Also the form of periodontitis witnessed was not the advanced type. The pockets were mostly between 4 and 6 millimeters. There were no cases of Acute necrotizing gingivitis (ANUG).

The possible explanation to these differences between the previous studies and this one could be due to the reason that the previous studies dealt with AIDS patients while this study dealt with asymptomatic HIV infected patients. Due to differences in the degree of immune suppression, presentation of lesions is likely to be different. As already mentioned, most of those examined were in stage 2(asymptomatic stage) of HIV infection. There were very rare skin lesions(see table 8).

This study has shown that several different oral lesions appear very early in HIV infected individuals. These lesions vary in degree and occurrence from one population to the other as already indicated in table 1.

About 50% of the cases exhibited increased pigmentation as compared to about 20% of the controls. The major areas of the oral cavity affected in both groups were the palate, tongue, Buccal mucosa, floor of the mouth, lower lip and attached gingiva in that order. This change in pigmentation could have significant

correlation with HIV infection. Langford et al(19), in his study of fifteen(15) non-smoking HIV-positive patients and ten(10) non-smoking HIV-negative individuals,found that ten(10) patients from the first group had hyperpigmentation as compared to five(5) from the second group. He therefore notes that the high imbalance of distribution and status of local immunocytes in hyperpigmented HIV-positive patients may reflect the functional impairment of the oral mucosa. He also states that the sudden onset of melanin deposition might be caused by inflammatory/post-inflammatory reactions and seems to be correlated with the progression of AIDS manifestation.

There was no difference in caries experience between cases and controls. This could be due to the fact that HIV infection does not seem to affect the hard tissues of the body e.g. bone and teeth.

The fact that other known signs and symptoms of HIV related disease were largely absent or in insignificant number is important. Conditions like weight loss, diarrhoea, lymphadenopathy fever, prolonged cough, skin lesions were very rare (See Table 6 and 8). This would therefore indicate that oral lesions may have an earlier onset in HIV infection, and hence can be used diagnostically to detect infection due to HIV.This ofcourse will be subject to confirmation by more refined tests. This therefore means that the oral cavity has to be examined more regularly for earlier signs of HIV infection.

These findings, also, emphasize the point that health care delivery personnel should always apply preventive measures against

transmission of HIV when dealing with patients whether they have proved to be HIV positive or not. This is because clinical signs and symptoms of HIV infection may sometimes not appear until very late.

Figure 15 : Pseudomembranous Candidiasis:

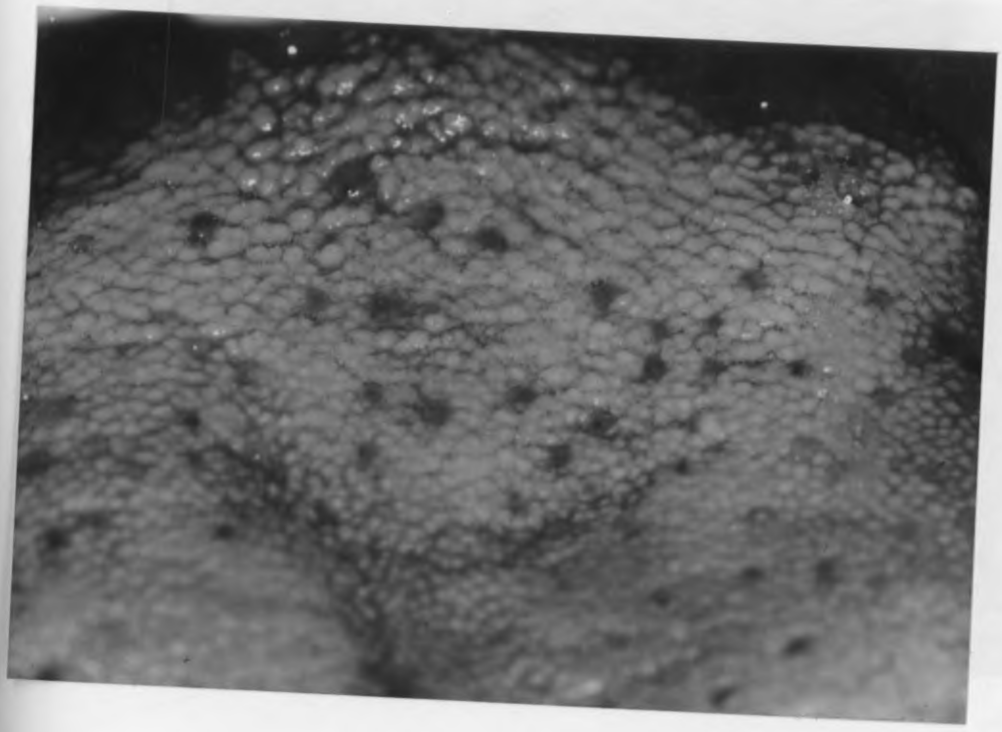


Figure 16: Pseudomembranous and Erythematous Candidiasis:

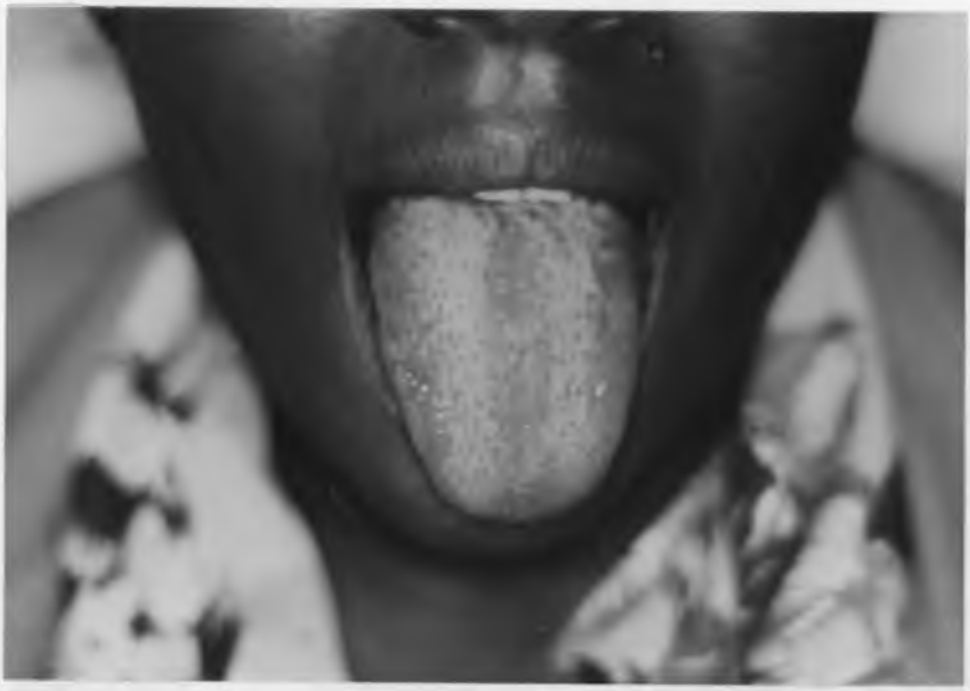


Figure 17: Palatal Erythematous Candidiasis:

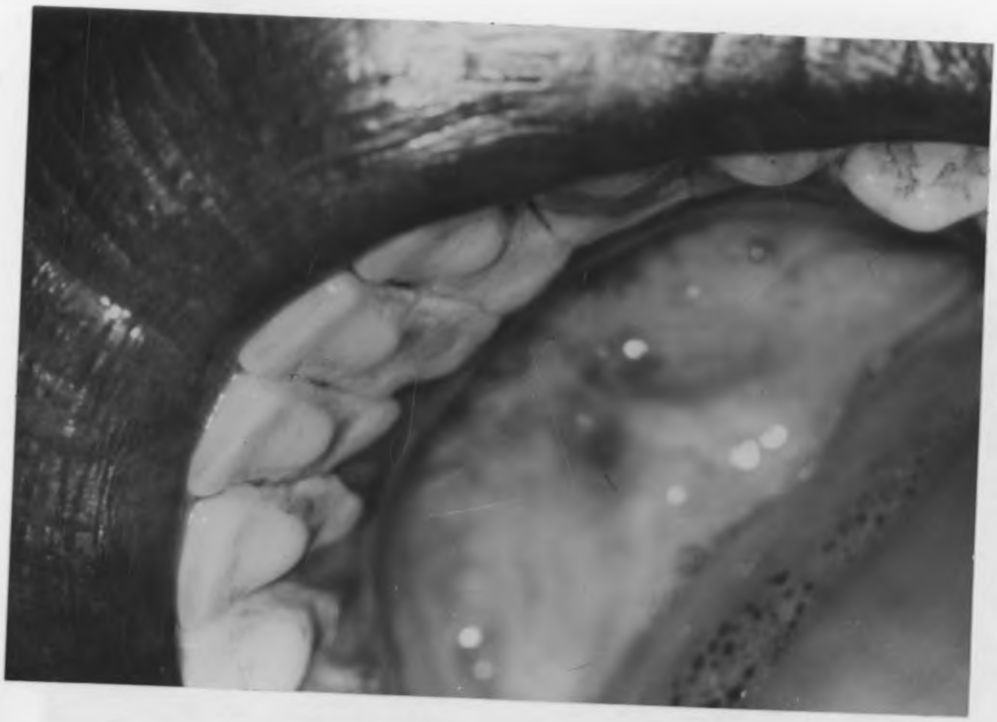


Figure 18: Lingual Hairy Leukoplakia:

Figure 19: Palatal Kaposi's Sarcoma:

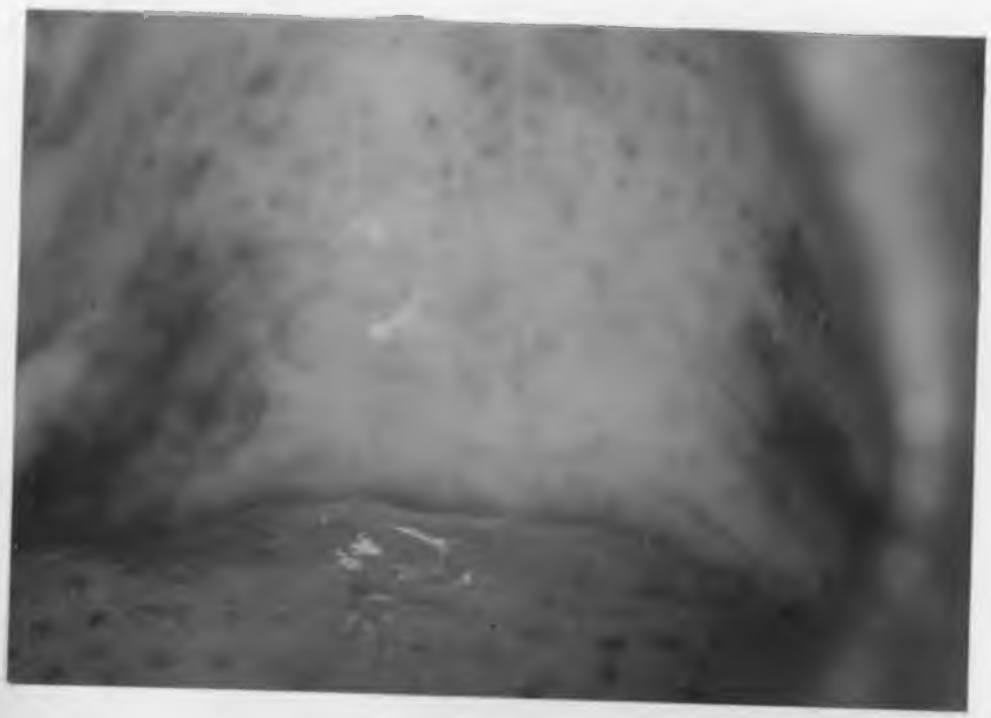


Figure 20: Increased Pigmentation on the Lingual:

CONCLUSION

Oral candidiasis, periodontal disease (gingivitis and periodontitis) and hyperpigmentation are all associated with asymptomatic HIV infection. The persistence of these lesions in the absence of known causes for immunosuppression should indicate for further investigation for HIV infection.

Recommendations

A more detailed study in this group is required in order to establish the possible risk factors and any other mode of HIV transmission.

More studies are required in order to find out the predictive value of these lesions (Candidiasis, periodontal disease and melanoma) in various localities and with different population groups.

A more detailed study of oral lesions in relation to HIV infection is definitely required.

There is dire need for intra and inter-departmental collaboration and cooperation in research.

Annex I

PROFORMA: EVALUATION OF ORAL STATUS

Patient's initials _____

1. Examination number _____ ___ 1

2. Date (day/month/year) _____

3. Date of 1st test (day/month/year) _____

4. Result of 1st test 0 = negative 1 = positive

5. Date of 2nd test (day/month/year) _____

6. Result of 2nd test 0 = negative 1 = positive

7. Status 0 = control, 1 = case ___ 2

8. Ethnicity _____ ___
3

9. District (if in Kenya) 0 = South Nyanza, 1 = Siaya, 2 = Kisii, 3 = Kisumu, 4 = Busia, 5 = Bungoma, 6 = Kakamega, 7 = Turkana, 8 = West Pokot, 9 = Trans-Nzoia, 10 = Uasin Gishu, 11 = Elgeyo-Marakwet, 12 = Baringo, 13 = Samburu, 14 = Laikipia, 15 = Nandi, 16 = Nakuru, 17 = Narok, 18 = Nyandarua, 19 = Nyeri, 20 = Muranga, 21 = Kiambu, 22 = Marsabit, 23 = Isiolo, 24 = Meru, 25 = Embu, 26 = Kitui, 27 = Machakos, 28 = Mandera, 29 = Wajir, 30 = Garissa, 31 = Tana River, 32 = Lamu, 33 = Kilifi, 34 = Kwale, 35 = Taita Taveta, 36 = Mombasa, 37 = Nairobi, 38 = Kajiado, 39 = Kirinyaga, 40 = Kericho.

10. Age _____ ___
4

11. Sex. F = 1, Male = 2 ___
5

12. Marital Status. 0 = Single, 1 = Married, 2 = Separated, 3 = Divorced, 4 = Widowed. ___
6

13. Occupation. 0 = Business, 1 = Farmer, 2 = Salaried Worker, 3 = Jobless.
Specify occupation _____ ___
7

14. Level of Education. 0 = no formal education, 1 = primary level, 2 = O'level, 3 = A'level, 4 = College, 5 = University. ___ 8

History

15. Been hospitalized in the last two years? 0 = no, 1 = Yes. Reason _____ ___ 9

16. Visited a doctor or clinic in the last one year? Yes = 1, no = 0 _____ ___ 10

17. Taken medication? Regularly in the past one year? 0 = No, 1 = Yes ___ 11

18. Received blood transfusion 0 = No, 1 = Yes ___ 12

19. Received traditional therapy. 0 = No, 1 = Yes ___ 13

20. Sexual habits, 0 = heterosexual, 1 = homosexual, 2 = bisexual. ___ 14

21. Frequency of changing sexual partners. 0 = not at all, 1 = daily, 2 = weekly, 3 = monthly. ___ 15

22. Weight loss over 10% baseline. 0 = No, 1 = Yes ___ 16

23. Diarrhoea? 0 = no, 1 = yes, 1 or more distinct bouts of loose stools each lasting less than one month, 2 = yes, prolonged, loose stools for longer than a month. ___ 17

24. Fever? 0 = no, 1 = yes, 1 or more distinct febrile illness each lasting less than one month, 2 = yes, lasting for more than one month. ___ 18

25. Received injection? 0 = no, 1 = yes
Specify _____ ___ 19

26. Diagnosis of lymphoma or any other cancer in the past. 0 = no, 1 = yes, specify _____ ___ 20

27. Any other signs/symptoms. 0 = no, 1 = sensitivity, 2 = pain, 3 = ulcer, 4 = bleeding, 5 = bad smell, 6 = swelling, 7 = white patches, 8 = dryness of mouth, 9 = 2+3+4+5, 10 = any other. ___ 21

28. Prolonged cough. 0 = no, 1 = yes ___ 22

Examination:

29. Generalized lymphadenopathy (LN over one cm diameter in more than one non-contiguous site excluding the inguinal. 0 = no, 1 = yes. ___ 23

30. Pallor/anaemia? 0 = no, 1 = yes. ___ 24

31. Jaundice. 0 = no, 1 = yes. ___ 25

Skin lesions

32. Zoster? 0 = no, 1 = active, 2 = scar, 3 = both

Describe Location _____

Specimen No. _____ Photo Nos._____ ___ 26

Maculopapular rash? 0 = no, 1 = cause unknown

2 = eczema/contact dermatitis, 3 = scabies,

4 = 2+3. Describe _____

Specimen No. _____ Photo Nos. ___ 27

Kaposi's Sarcoma? 0 = no, 1 = yes

Describe _____

Specimen No. _____ Photo Nos. _____ ___ 28

Other skin lesion(s) 0 = no, 1 = yes

Describe _____

Specimen No. _____ Photo Nos. _____ ___

29

33. Oral lesions

Fungal Oral Candidiasis? 0 = no,

1 = pseudomemb, 2 = Erythematous,

3 = hyperplastic, 4 = angular chelitis

site(s) and Description _____

Specimen No. _____ Photo Nos. _____ ___

30

Bacterial: 0 = no, 1 = gingivitis, 2 = ANUG,

3 = periodont, 4 = 1+3.

Site(s) and Description _____

Specimen No. _____ Photo Nos. _____ ___

31

Viral 0 = no, 1 = Herpetic Stomatitis (HSV

induced), 2 = Oral Zoster (VZV induced)

3 = Hairy Leukoplakia (EBV induced) 4 = oral

ulceration (CHV induced)

Site(s) and Description _____

Specimen No. _____ Photo Nos. _____ ___

32

Kaposi's Sarcoma? 0 = no, 1 = present

Site(s) Description _____

Specimen No. _____ Photo Nos. _____ ___

33

Melanoma? 0 = no, 1 = yes _____

Site(s) and Description _____

Specimen No. _____ Photo Nos. _____ ___

34

34. Periodontal condition. 0 = normal gingiva, 1 = bleeding on probing, 2 = spontaneous bleeding, 3 = pocket depth 4mm, 4 = pocket depth between 4-6 mm, 5 = pocket depth over 6mm ___

35

35. Caries status (number of carious teeth) 0 = none, 1 = 1-5, 2 = 6-10, 3 = over 10. ___

1st quadrant 36

___

2nd quadrant 37

___

3rd quadrant 38

___

4th quadrant 39

36. Habits

(a) Alcohol. Duration. 0 = never, 1 - less than six months and one year, 2 = between six months and 1 year, 3 = 1 - 5 years, 4 = over 5 years. ___

40

Quantity: 0 = one litre per week, 1 = between 1 - 5 litres per week, 2 = between 5 - 10 litres per week,

3 = over 10 litres per week. ___ 41

Types. 0 = Beer, 1 - local brew,
2 = spirits ___ 42

(b) Miraa. Duration. 0 = never, 1 = less than six months, 2 = between six months and one year, 3 = between 1-5 years, 4 = over 5 years ___ 43

Quantity 0 = one bundle per day, 2 = two bundles per day, 3 = over two bundles per day. ___ 44

(c) Smoking. Duration. 0 = never, 1 = less than six months, 2 = between six months and one year, 3 = between 1 - 5 years, 4 = over 5 years. ___ 45

Quantity. 0 - less than one packet per day, 1 = between 1 and 2 packets per day, 3 = over two packets per day. ___

46

Type. 0 = filtered, 1 = unfiltered. ___

47

(d) Tobacco. Duration. 0 = never, 1 = less than six months, 2 between six months and one year, 3 = between Quantity (specify)/day _____ ___

48

(e) Drugs. Duration. 0 = never, 1 = less than six months, 2 = between six months and one year, 3 = between 1 - 5 years 4 = over 5 years.

Type (specify) _____

Quantity (specify) _____ ___

49

Previous dental management

(a) Fillings. 0 = no, 1 = yes ___ 50

Type. 0 = amalgam, 1 = composite, 2 = TF ___ 51

Number. 0 = 1 -5, 1 = 6 -10, 2 = over 10 ___ 52

When? 0 = less than six months ago,
1 = between six months and one year,
2 = between 1 - 5 years, 3 = over 5 years ___ 53

(b) Scaling? 0 = no, 1 = yes ___ 54

Frequency. 0 = every six months, 1 = every year, Z = every two years ___ 55

(c) Extractions? 0 = no, 1 = yes ___ 56

Number. 0 = 1 - 5, 1 = 6 - 10, 2 = over 10 ___ 57

When? 0 = less than six months ago,

1 = between six months and one year,

2 = between 1 - 5 years, 3 = over 5 years. ___

58

(d) Surgery? 0 = no, 1 = yes ___

59

Specify _____

When? 0 = less than six months ago,

1 = between six months and one year,

2 = between 1 - 5 years, 3 = over 5 years. ___

60

Annex 2

CRITERIA FOR DIAGNOSIS OF ORAL LESIONS.

Pictures and criteria for ORAL MANIFESTATIONS IN HIV-INFECTED PATIENTS by JENS J. PINDBORG. Oral Health Unit, WORLD HEALTH ORGANIZATION.

PRESENT DIAGNOSTIC CRITERIA:

CANDIDIASIS

Pseudomembraneous: The pseudomembraneous candidiasis presents a white or yellow removable plaque leaving a red surface. Pseudomembraneous may be located in all parts of the oral cavity.

Erythematous: Defined as a red area without white removable plaques. Often located on palate, dorsum of the tongue and buccal mucosa. Smears from red areas are positive for Candida hyphae on PAS staining.

Angular: Fiery red commissure. Smears from red areas are positive for Candida hyphae on PAS staining.

GINGIVITIS: Gingivitis is characterized by fiery red area edematous attached gingiva

and may involve the alveolar mucosa. No ulceration must be present. Any gingiva which presents an unusual(atypical) clinical appearance,e.g. candidiasis affecting the gingiva, a 1-2 mm wide, fiery red band, along the margin of the gingiva, or focal enlargement of gingiva.

NECROTIZING GINGIVITIS: Necrotizing gingivitis is characterized by gingival pain, swelling, ulcerations, necrosis and/or destruction of dental papillae covered with a fibrinous slough. Where several areas of gingiva present features of necrotizing gingivitis, e.g. pseudomembrane, bleeding, loss of gingival tissues. The patient suffers fever and halitosis is present.

PERIODONTITIS: Periodontitis is characterized by aggressive irregular bone destruction. Any affection which gives the impression of involving other periodontal structures than the gingiva

HERPES LABIALIS,
HERPETIC STOMATITIS: Oral herpes infections present as a primary herpetic gingiva-stomatitis or as

* secondary recurrent herpes labialis. Both types start as vesicles which rapture and lead to ulcerations.

HAIRY LEUKOPLAKIA: Hairy leukoplakia present as white, non-removable lesion on margin of the tongue. The surface is corrugated, but might be non-corrugated if it is seen on the inferior surface of the tongue or in the buccal mucosa. To establish a reliable diagnosis, a biopsy must be performed. Biopsy from hairy leukoplakia shows hairlike projections, hyperparakeratosis, koilotic-like cells and no inflammation. The surface layers of the epithelium shows numerous hyphae of Candida. Differential diagnosis includes pseudomembraneous candida, lichen planus, "galvanic" lesions and other white lesions. Note should be made if the clinical diagnosis has been confirmed by biopsy, or not. This information is required for this condition in view of the seriousness of the prognosis implications.

ORAL KAPOSI'S SARCOMA: A characteristic macroscopic appearance, of either erythematous or violaceous

	plaque-like lesions,or a bulky tumor. Predominantly seen in the palate or on the gingiva. Note should be made if the clinical diagnosis has been confirmed by biopsy, or not. This information is required for this condition in view of the seriousness of the prognosis implications.
RECURRENT APHTHOUS ULCERATIONS:	A condition characterized by recurrent ulcers of the oral mucosa. the size of the ulcers presents considerable variaticn. Aphthous lesions are well demarcated, fibrin covered ulcers surrounded by a red halo.
ORAL ULCERATION NOS:	Progressive necrotizing ulcerations with unknown etiology.
ENLARGED SALIVARY GLANDS:	No other definition necessary.
UNKNOWN:	Unidentifiable oral lesion characterized by the three parameters, "red", "white", and "swelling".

Annex 3

CRITERIA FOR CLASSIFICATION OF HIV INFECTIONS.

Definition of HIV infection by CENTERS FOR DISEASE CONTROL.

SUMMARY OF CLASSIFICATION SYSTEM FOR HUMAN IMMUNODEFICIENCY VIRUS

GROUP 1: ACUTE INFECTION.

Will be reclassified following resolution.

GROUP 11: SYMPTOMATIC INFECTION.

Must have had no previous signs or symptoms that would have led to classification in groups 111 or 1V.

GROUP 111:

Persistent generalized lymphadenopathy.

GROUP 1V: OTHER DISEASE

Subgroup classification independent of lymphadenopathy.

Subgroup A- Constitutional disease

Fever for over 1 month, weight loss in excess of 10% of the base-line weight and diarrhoea for over 1 month.

Subgroup B- Neurological disease

Dementia, myelopathy, or peripheral neuropathy.

Subgroup C- Secondary infectious diseases

C1 Those specified in the Centers for Disease Control surveillance definition.

C2 Others: Oral hairy leukoplakia, multidermatomal, herpes zoster, recurrent Salmonella bacteremia, nocardiosis, tuberculosis or oral candidiasis.

Subgroup D- Secondary cancers

Kaposi's sarcoma, non-hodgkin's lymphoma or primary cerebral lymphoma.

Subgroup E- Other conditions.

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