International Journal of Collaborative Research on Internal Medicine & Public Health
Vol. 2 No. 3 (March 2010)
pp. 50-78

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International Journal of Collaborative Research on Internal Medicine & Public Health
Vol. 2 No. 3 (March 2010)
Pages 50-78

ISSN 1840-4529

http://www.iomcworld.com/ijcrimph/

Paper review summary:
Paper submission: December 09, 2009
Revised paper submission: February 17, 2010
Paper acceptance: March 16, 2010
Paper publication: March 19, 2010

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A hospital based cross sectional study of mucocutaneous manifestations in the HIV infected

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Abstract

Background: HIV infection produces a panorama of mucocutaneous manifestations ranging from macular, roseola like rash in the acute seroconversion illness to end-stage, extensive Kaposi sarcoma. Certain studies showed dermatological lesions are indicators of the immune status of the patient. So here is an attempt to find out the spectrum of dermatological lesions in HIV infected, their association with the CD4+ cell count, and to compare the pattern of dermatological lesions between patients on HAART and patients not on HAART.

Aims: To conduct a clinical study of mucocutaneous manifestations in HIV-positive patients visiting Skin and STD Dept. of Krishna Rajendra(K.R.) hospital, Mysore Medical College and Research Institute, with special reference to age, gender and risk factors.

Methodology: Cross-sectional study with simple random sampling technique was conducted at K.R.Hospital, Mysore Medical College and Research Institute, India between August 2007 and October2008. The study involved 350 HIV positive patients aged between 16-60y of which 175 were on HAART presenting with some mucocutaneous manifestations and 175 were not on HAART consisting of patients who presented with a symptom of one of the mucocutaneous lesions. They did not know if they were HIV infected. After they were tested they were found to be positive and were included in the study. They were procured from the Anti Retroviral Centre of our hospital. Mean duration of HAART initiated life is 6months.
Before involving the patients in the study ,written informed consent was obtained from the patient/legal guardian both in English and local language. Appropriate lab investigations were done i.e. HIV status, base line investigations like Hemoglobin, Peripheral Blood Smear, KOH test, VDRL test, CD4 cell count etc.., The data thus collected was tabulated with reference to some important parameters of the study. It was analysed using the software SPSS 11.4version

Results: Among the opportunistic infections and other infectious lesions (HAART and non-HAART put together), highest was viral(56%) followed by fungal (42%), bacterial(22%) and least being infestation. Viral infections were less on HAART initiated(32%) as compared to non HAART(80%). But the cases of bacterial and fungal infections were almost equal in both categories. There was significant increase in the cases of non infectious lesions on HAART population(88% against 40% in non HAART; $p<0.034$) due to drug eruptions and pruritic papular eruption. One case of pityriasis rosea in non HAART, resistant to treatment was diagnosed. When opportunistic manifestations among non-HAART were considered , oral candidiasis was the leading manifestation seen among the 28% of the study group with mean CD4 count of 150cells/cu.mm, followed by molluscum contagiosum- 24%,condyloma accuminatum-20% and herpes zoster-16%. Majority of the lesions were seen at the cell counts less than 200cells/cu.mm. The study was comparable to many Indian and foreign studies.

Conclusions: In correlation with CD4 cell count, mucocutaneous manifestations increased with decreased CD4 cell count [Regression Coefficient (-0.31) with 0.64 standard error of estimate and p-value <0.05].
When dermatological lesions of patient who are on HAART was compared with that of non-HAART, there was significant reduction in the prevalence of dermatological viral infection in CAT 2[under HAART-chi square=5.134; $p<0.023$].But prevalence of bacterial and fungal infections showed no change [$p=0.763$(NS) and $p=0.827$(NS) respectively].This may be due to poor socioeconomic status and poor hygiene.

Key Words: Highly active anti-retro viral therapy, Opportunistic infections, Human immunodeficiency virus, Mucocutaneous manifestations, Oral candidiasis, Herpes simplex

Background

"Infectious diseases will last as long as humanity itself"

Diseases are curse to mankind and HIV/AIDS has worsened it. According to recent Data, 33.2 million [30.6m-36.1m] are living with HIV worldwide, of which 2.5 million are newly infected cases in 2007 and 2.1 million died of AIDS in 2007 (UNAIDS update, 2007)**.** Data from NACO says 2.5 million are HIV infected in India & Karnataka is one of the high prevalence states (NACO document, 2006)**.** HIV infection produces a panorama of mucocutaneous manifestations, which may be the presenting feature of the disease. This ranges from macular, roseola like rash in the acute seroconversion syndrome to extensive end-stage Kaposi sarcoma. Dermatological features of HIV disease can be seen throughout the course of the HIV infection. So early diagnosis & early institution of therapy is required. With the advent of HAART, the course of HIV/AIDS has been significantly changed and thus associated dermatological lesions also (Maurer and Lori, 2004).Certain study showed dermatological lesions are indicators of immune status of the individuals. So here is an attempt to find the prevalence of dermatological lesions in HIV/AIDS infected their association with CD4+ cell count and to compare the prevalence of dermatological lesions between patients on HAART and patients not on HAART since 50% of the study populations are on HAART.

In this research work, 350 cases of HIV with skin lesions are studied of which 50% are on HAART. [Lamivudine, Stavudine & Nevirapine provided by NACO under brand name Emtri 30/40] & the remaining 50% were not on HAART.

Methodology and Materials

Study design: Cross-sectional study
Type of the study: Hospital based cross sectional study
Sampling technique: Simple random sampling.

Total number of new cases with mucocutaneous manifestations and those patients with mucocutaneous manifestation already on treatment for the year 2005-2006 was taken and sampling was done using software SPSS version 13.

Sample size: 350 members out of which 175 are on HAART (cat-2), and remaining 175 members are not on HAART (cat-1). The sample size was calculated by taking prevalence of skin manifestations among HIV positive patients as 39.3%. Sample size was calculated at 5% significant level and 10% error using software SPSS version 13.

Method of the study: The study was conducted at the Skin and STD Department of Krishna

Rajendra (K.R) Hospital allied to the Mysore Medical College and Research Institute, Karnataka from August 2007 to October 2008. The study group includes 175 patients who presented with a symptom of one of the mucocutaneous lesions. They did not know if they were HIV infected. After they were tested they were found to be positive and were included in the study.

Another 175 HIV positive patients, who are on HAART presenting with some mucocutaneous manifestations were procured from ANTI RETROVIRAL CENTRE of our hospital and were involved in the study after confirming the below mentioned criteria.

Inclusion criteria

1. HIV positive patients (positivity confirmed by ELISA method at VCTC centre of our hospital) giving consent to the study.

2. Age between 16 years to 60 years old.

Procedure

Before involving the patient in the study, depending on their educational status, written informed consent were obtained from the patient/legal guardian in English. Clearance from the institutional ethics committee was also obtained, Data was collected based on the proforma, which includes demographic profile and clinical findings. Findings were noted by the student under the guidance of the guiding professor. Finally, counseling was done regarding hygiene and diet.

Laboratory Investigations

1. HIV status was confirmed by ELISA method at VCTC centre of our hospital

2. Base line investigations were done to all patients such as Hb%, peripheral blood smear examination (PBS).

3. CD4+ count was estimated by FACS (fluorescence activated Cell sorter) count system at the department of Microbiology.

4. Potassium hydroxide (KOH) preparation was used to confirm Dermatophytosis.

5. VDRL tests were done to confirm syphilis infection.

Results

When socio-demographic profile was considered male and female patients are almost equal (Table 1). With low socioeconomic history, most of them acquired the infection from heterosexual contact. Among which about 90% of the female patients acquired from their husband.

When category I patients were considered; i.e. those who presented without the knowledge of their HIV status, Oral Candidiasis was the leading presenting complaint seen in 28% of the study population (Table 6). It is followed by Molluscum Contagiosum (24%) and then by Condyloma Acuminatum (20%) which was seen only in male patients and Multidermatomal Herpes Zoster (16%) (Table 2). So any patient with these symptoms can be suspected as a case of HIV if other conditions are ruled out. When all the infectious mucocutaneous manifestations were considered together, viral infections comprised of 56 %(196); among which 71.42 %(140) were in cat-1(non-HAART) And 28.58 %(56) in cat-2(under-HAART).This shows a significant reduction in viral opportunistic infection [chi-square=5.143:p<.023] among patients after the initiation of HAART[median duration of HAART in our study group was 6 months and combination used in our set up was Lamivudine, Stavudine and Nevirapine under the brand name Emtri 40/30]. One case of Pityriasis Rosea, resistant to routine mode of treatment was seen, but no other literature mentions its association. So, further studies are required in this line.

When the prevalence of dermatological lesions of patients who are on HAART [Emtri→lamivudine, Stavudine and Nevirapine, with median duration of 6 months], was compared with that of category I (non-HAART), there was significant reduction in the prevalence of dermatological viral infections in Cat II [under HAART – chi square = 5.134; p< 0.023] (Table 10). But the prevalence of bacterial and fungal infections showed no change [p = 0.763 (NS) and p = 0.827 (NS) respectively] (Table 11 and 12). When non-infectious lesions were considered, there was a significant [chi square = 4.50; p <0.034 (S)] increase in the prevalence among Cat II (under HAART) which was accounted by absolute increase in drug eruption and pruritic papular eruption (Table 13).

Discussion

Out of 350 cases studied, 52 % (182) were males and 48 % (168) were females. The subjects between 26-35years of age group were significantly high [chi-square=18.60; p<0.005]. Among which, we had 24 % (84) in 26-30 year age group and 30 % (105) in 31-35 year age group. This correlated with Bravo et al. (2006) who found out that the most affected age group was 30 to 39yrs-51%. The frequency of males and females in this age group was almost similar. Only 4 % (14) of individuals were in 16-20 years and none in between 51-60years. Thus study shows the high prevalence of HIV/AIDS in middle aged population resulting in considerable reduction in the manpower and increase in the economic burden of the nation (NACO Document, 2006).

When occupation was considered, 48% (168) were involved in unskilled occupation [chi-square=14.8; p<.002], among which female patients constituted for 75% (126) of the total. It is followed by skilled worker, i.e. 22% (77), in which male patients showed an upper hand

which is followed by farmers 16 % (56) and semiskilled workers 14 % (49). This correlates with Singh et al. (2009) whose study also consisted of 46% unskilled workers, semi- skilled workers formed 23% and farmers formed 5% of the group. Mode of acquiring the disease among the study group was absolutely heterosexual, no other modes were reported. This is similar to Singh et al. (2009) who reported 94.16% heterosexual transmission. In our study, 28% (98) denied any mode of transmission, while the other 72% (252) admitted the heterosexual mode of transmission. Of them 36 % (126), who were all females acquired from their spouse. In remaining 36 % (126), who acquired from external source, 88.8 % (112) were males and 11.11 % (14) were females. Most of the males acquired from Commercial sex workers (CSW) and out of 2 females 1 was CSW and other admitted her high risk behavior.

From this we can conclude that low socioeconomic status may be one of the associated factors for rampant HIV/AIDS in our country.

Condyloma acuminatum 14 % (49) was the common diagnosis among the viral OIs, of which 71.4%(35) cases were cat-1 and 28.5%(14) cases in cat-2 which shows decrease in the prevalence among HAART initiated patients .Mean CD4+ cell count among cat-1 was 197cell/mm^3 and in cat-2 was 319cell/mm^3.When compared to Munoz Perez, Rodriguez-Pichardo, , Camacho, & Colmenero,(1998) this is bit high as they report that HIV infection itself predisposes to an increased risk of HPV infection that is not directly related to the degree of immunosuppression. Studies by Shobhana, Guha, and Neogi DK (2004) show still low i.e. 0.5%. Our study is comparable to Hengge et al. (2000) as they also found a significant decrease in the prevalence of Condyloma acuminatum in their study recruited after the initiation of HAART.

Herpes zoster (HZ) was the next most common [12 % (42)] diagnosis.This is comparable to Kumarasamy et al. (2000) and Mbuagbaw et al. (2006) who reported a prevalence of 11.2% and 9.7% respectively. In our study, among the 12% (42) of cases, 67 % (28) cases were in cat-1 and 33 % (14) cases were in cat-2. Mean CD4+ count for cat-1 was 273.2 cell/mm^3, but in cat-2 mean CD4+ Count was significantly low i.e. 56 cell/mm^3.This shows that HZ can occur at all degree of immunosuppression. Hengge, Ulrich R, Franz, Barbara, Goos(2000) reports the HZ incidence is directly related to the viral load. This may be the reason why our patients (cat-2) had significant high prevalence as their CD4+ Count was too less, which is the indirect evidence of high viral load and thus they are on HAART.

Molluscum contagiosum [12 % (42)] was seen only in cat-1 patients with mean CD4+ of 155.1cell/mm^3 which (CD4+ Count) is higher than that reported by Sen et al. (2009) who reported a mean CD4 count of 98cells/cu.mm. This finding is significant as no cases were seen in patients under HAART (cat-2).

Herpes simplex virus (HSV) genitalis [10 % (35)], HSV labialis [2 % (7)] were frequent viral OIs. Among HSV Genitalis, 80 % (28) of the cases were in cat-1 and only 20 % (7) in cat-2.Our study is comparable to Shobhana, Guha, and Neogi (2004) which shows (8%) with mean CD4+ Count of 187cell/mm^3 against 211.5 of our study, but Nair SP , Moorty KP, Suprakasan S (2003) reports very low prevalence (2.74%). Our study was also comparable to Munoz-Perez, et al. (1998) as they also reported reduced prevalence in “under HAART” category. HSV labialis was seen only in Cat-2 and no other study reports association, this

may be coincidental.

Verruca vulgaris 6 % (21), of which 33 % (7) were in cat-1 and almost double cases in cat-2. This is comparable to Hengge et al. (2000) as they also reported the increase in prevalence in their "under HAART" category.

Bacterial skin infections were seen in 22 % (77) of the subjects, which was suspected to be caused by Staphylococcus aureus. This is comparable to Bhandary et al. (1997) who report a prevalence of 25%. When individual lesions such as Furuncle (8%), Carbuncle (2%), Folliculitis (8%), Abscess (2%) are considered it is comparable to Munoz Perez et al. (2008) reported 1.6% prevalence of folliculitis, which is lower compared to our study but a CD4 count of 127.3cells/cu.mm which is comparable to CD4 count of 130cells/cu.mm in our study. When cat-1[45.54 % (35)] and cat-2[54.45 %(42)]was considered, there is slight increase in cat-2, even when they are in HAART. This may be attributed to the poor socio economic status of our study population. 7 (4%) cases of syphilis were reported in cat-1 and none in cat-2.

Fungal infection comprised of 42 % (147), of which Dermatophytes accounted for 22 % (77), oral candidiasis-14 % (49), Onychomycosis-4 % (56), pityriasis versicolor-2% (7). When Dermatophytes 22 % (77) were considered, it was slightly higher than other studies such as Samet et al. (1999) who reported a prevalence of 34%. This is due to lower socioeconomic status of our study population. When cat-1[18.18 % (14)] and cat-2 [81.81 % (63)] were considered separately, there was significant high prevalence [$p<.05$] among cat-2 group. Individual lesion of cat-1 such as tinea pedis [4 % (7)] and tinea cruris [4 % (7)] with mean CD4+ count of 79cell/mm^3 were comparable to Munoz Perez et al. (1998),But prevalence of lesions in cat-2 were significantly high may be due longer duration of mean HIV positive life when compared to cat-1, where they are recently infected. 4 % (14) of Onychomycosis and 2 % (7) of pityriasis versicolor were seen. Prevalence of onychomycosis was equal in cat-1 and cat-2, and no cases of pityriasis versicolor in cat-2. Prevalence of onychomycosis was comparable to MunozPerez et al. (1998) (4%) but CD4+ count was very low, 67cell/mm^3 against their 161cell/mm^3. Mean CD4+ Count of pityriasis versicolor was 46cell/mm^3. Oral candidiasis accounted for 14 % (49), seen only in cat-1, with mean CD4+ Count of 150.8.This prevalence was lower than that reported by Sengupta et al. (2000) -36%. Among 49 cases, 42 cases were pseudomembranous type and 7 cases of erythematous type. Mean CD4+ Count was 150.8cell/mm^3.

Among infestations, 7 cases of scabies were diagnosed in cat-1 and none in Cat- 2 that was comparable to Kumarasamy et al. (2000) (0.5%).

Non-infectious lesions were present in 64 % (224) of the study group in which the incidence in category 2 [68.75 % (154)] was significantly higher, when compared to category 1 [31.25 %(70)]. When each lesion was considered separately seborrhoeic dermatitis 14%

(42) was the most common diagnosis, of which 29 % (14) were in category 1 and 71 % (35) cases were in category 2 and mean CD4+ count was 85.05cells/cu.mm. The prevalence was bit high when compared to other studies such as Sen et al. (2009) where the prevalence was 8.5%. This is probably because their study was conducted in a more mild and temperate

climate. Rajagopalan, Jacob, and George (1996) also showed increased prevalence compared to our study. Hengge et al. (2000) reports decrease in prevalence from 25.3% to 17.6% in patients who are HAART. But a paradoxical increase was seen in cat-2(under HAART) study group in our study.

Xerosis was the next common [10 % (35)] diagnosis of which 40 % (14) cases were in Cat-1 (non HAART) and 60% (21) in cat-2. The mean CD4+ count was very low (35.75cells/mm^3).The prevalence in our study is low compared to that reported by Sud et al. (2009) -22.7%. There was a bit high prevalence in cat- 2 (HAART) when compared to cat-1 but Maurer and Lori (2004) reports a decreased prevalence in HAART initiated patients. And most of the patients were cachexic.

Eosinophilic folliculitis was seen in 6 % (21) of study population of which 66.7% (14)were in cat -1 (non HAART) and 33.3% (7) were in cat-2(HAART). In our study mean CD4+ count was 121.5cell/mm^3, out of the 21 cases diagnosed, 14 cases fulfilled the criteria [clinical, Histopathology and laboratory], but other seven cases were diagnosed only on clinical grounds.This was comparable to CD4 count of 115.54cells/cu.mm reported by Priya et al. (2005)

Pruritic papular eruptions (PPE) were seen in 8 % (28) of our patients, and all of them were from cat-2, with mean CD4+ Count of 119.2cell/mm^3. This is comparable to Lakshmi et al. (2008) who report a prevalence of between 11 and 46% with a mean CD4 count of 153 cells/cu.mm. Also the CD4+ Count of 119.2cell/mm^3 was comparable to Boonchai et al. (1999) where they reports PPE as a marker of advanced HIV (low CD4+ count). To support this evidence, PPE was seen only in cat-2 patients as these patients were on HAART owing to their advanced HIV infection.

Drug eruption was seen in 12% (42) of our patients. Nair, Moorty, and Suprakasan (2003) (1.65%) reports very low prevalence probable because their patients were in initial stages of the disease against our population, where it is seen only in cat-2 ,who were in advanced stage of the infection .Of 12% (42), 8% (28) were Nevirapine rash[erythema multiforme and acneform eruptions] and 4%(14) were Lichenoid eruptions. Mean CD4+ Count was 92cell/mm^3. This is illustrated by Coopman et al. (1993) who have shown that it is extremely common in HIV infected patients and prevalence increases as the immune function deteriorates.

One case of pityriasis rosea was diagnosed in cat-1, but no literature mentions it as an opportunistic infection (OI). Some workers such as Robert A Allen, Robert A Schwartz(2009) associates Human Herpes Virus -7(HHV-7) as causative agent .Since herpes group of virus are common opportunistic agents in HIV infection, this may be a true association and further study is required in this regard.

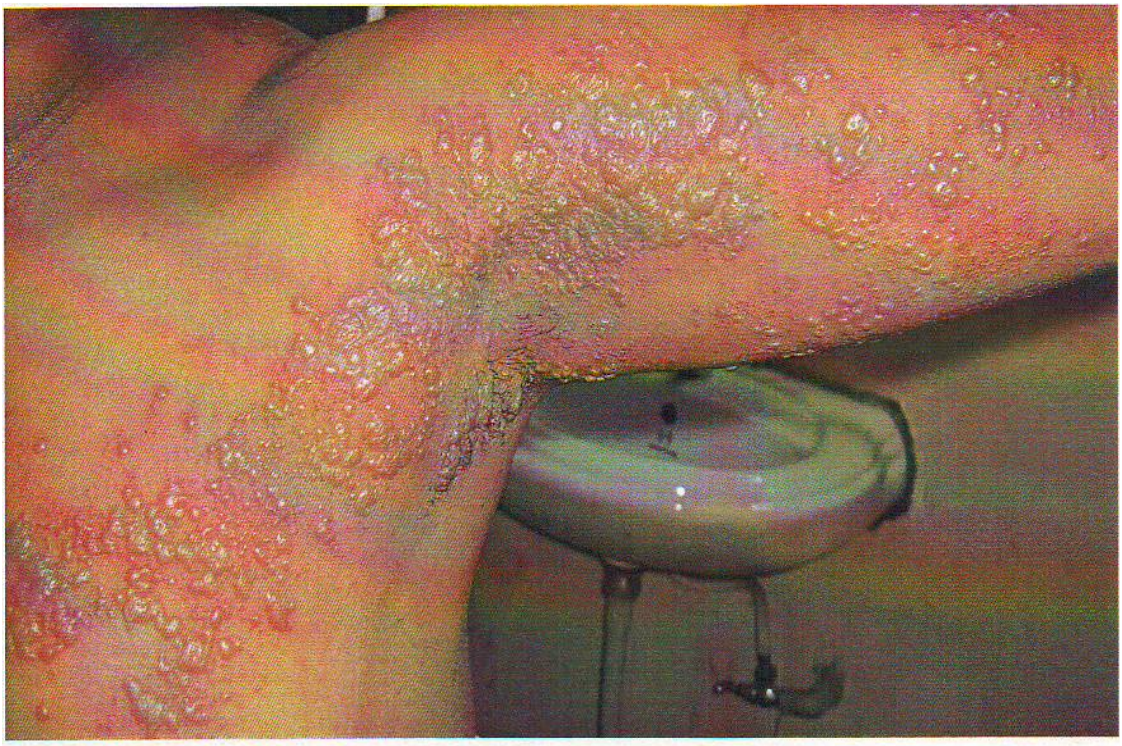

FIG 1: Multidermatomal Herpes Zoster involving C8, T1, and T2&T3 Dermatome on left side

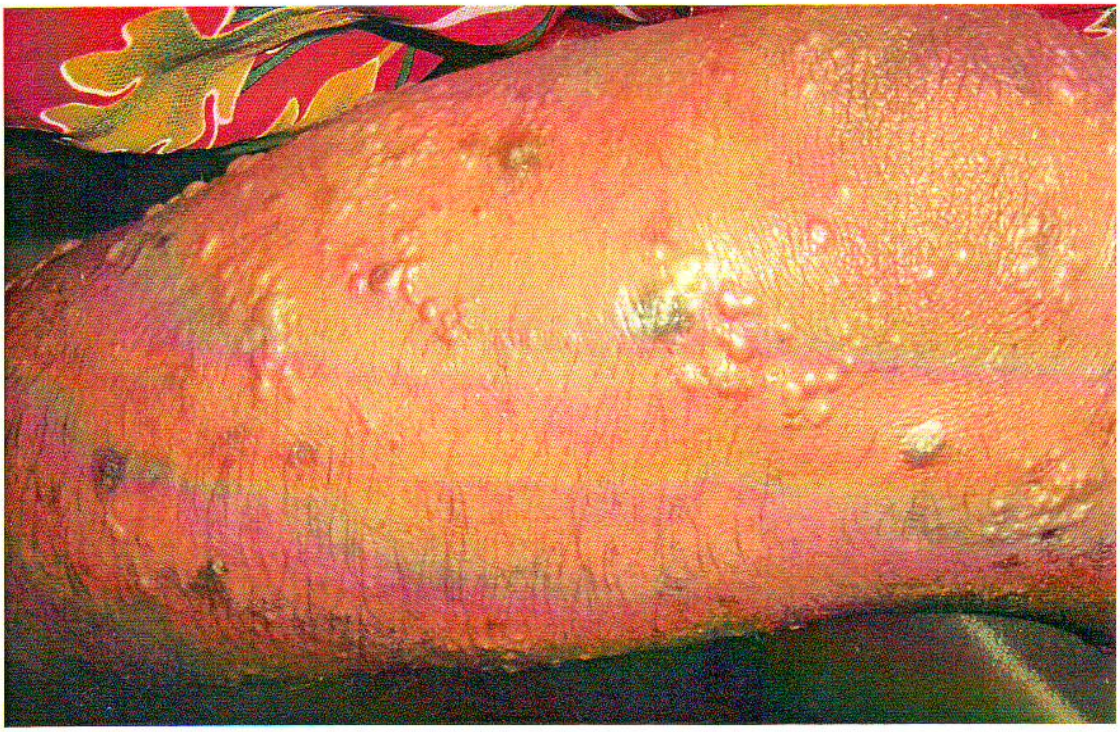

FIG 2: Vesicular eruptions of HERPES ZOSTER and drug induced Licheniod eruptions over the dorsum of the left forearm.

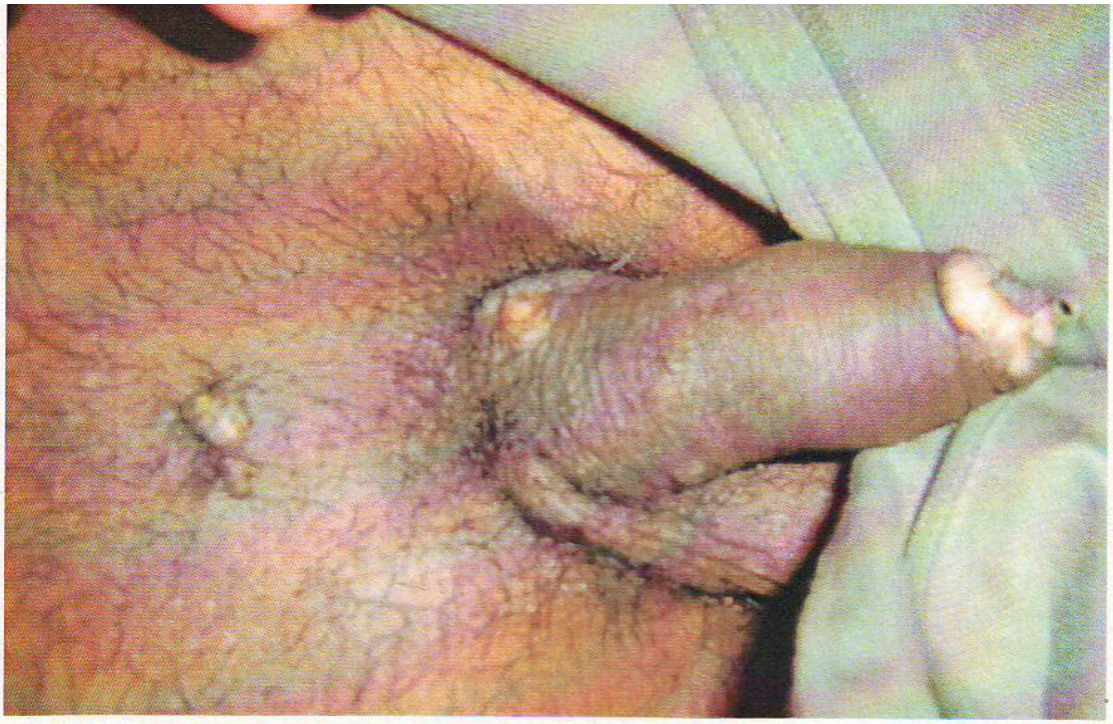

FIG 3: Verrucated papules of Condyloma accuminatum over the prepuce, root of the penis and in left suprapubic region.

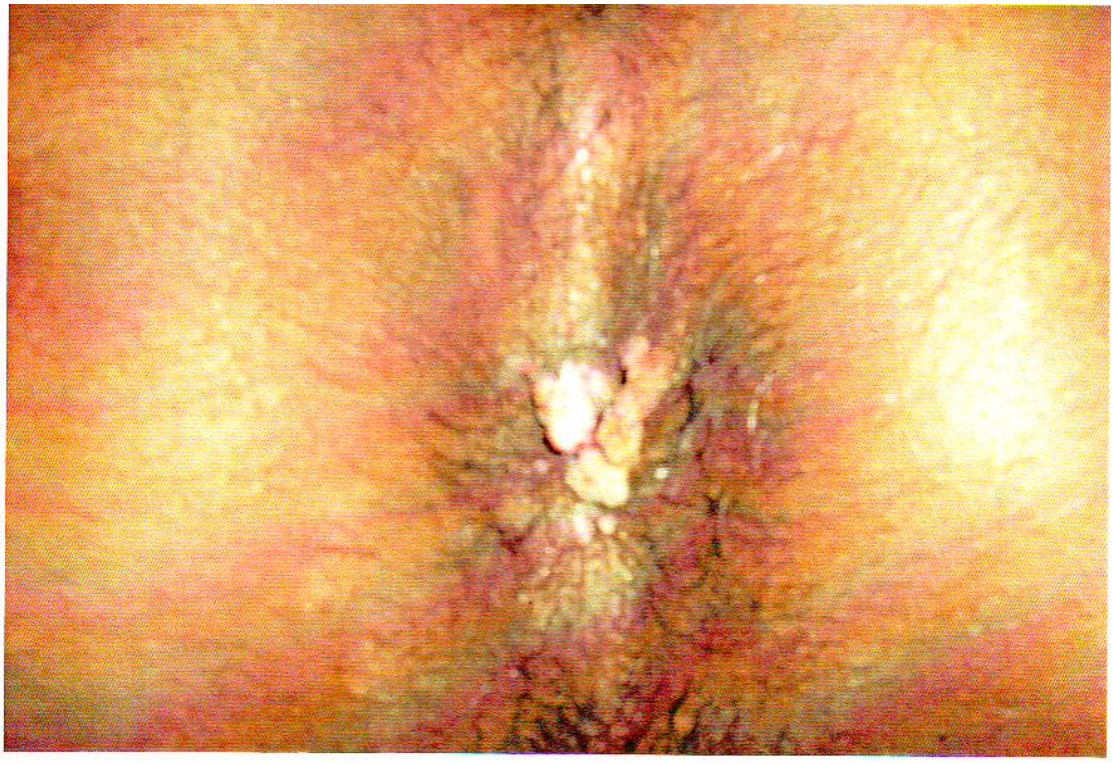

FIG 4: Verrucated multiple papules of the condyloma accuminatum over the perianal region.

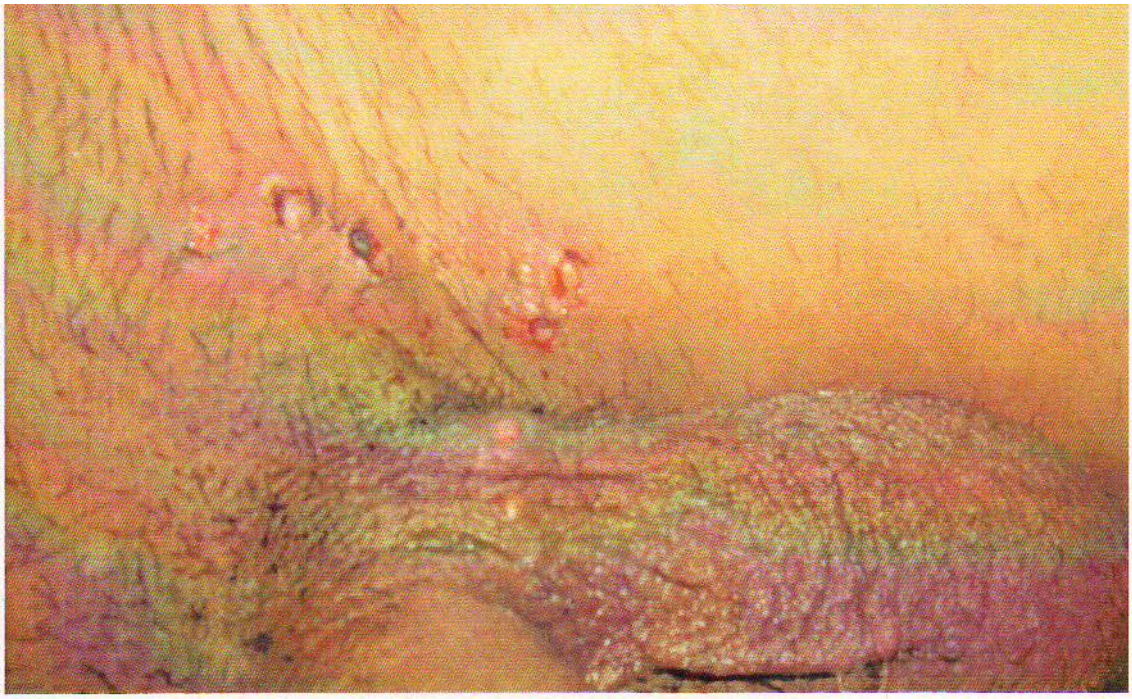

FIG 5: Genital molluscum contagiosum in male patient .Shiny white umbilicated papules over the root of the penis.

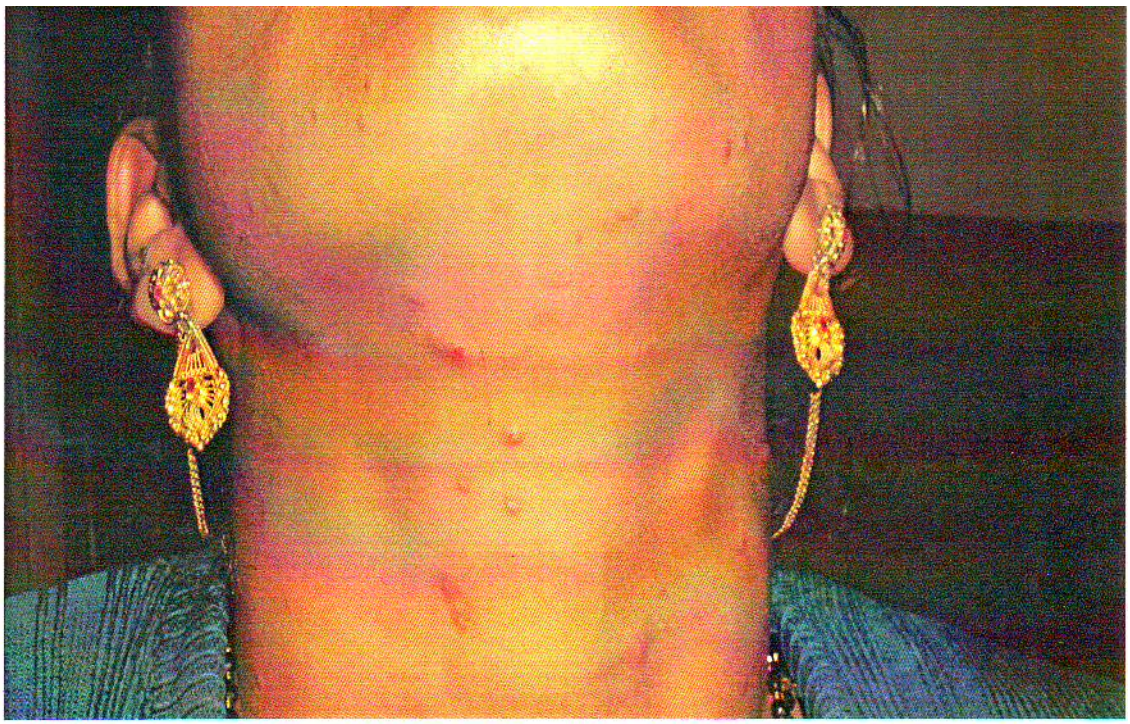

FIG 6: Molluscum contagiosum over the neck and face.

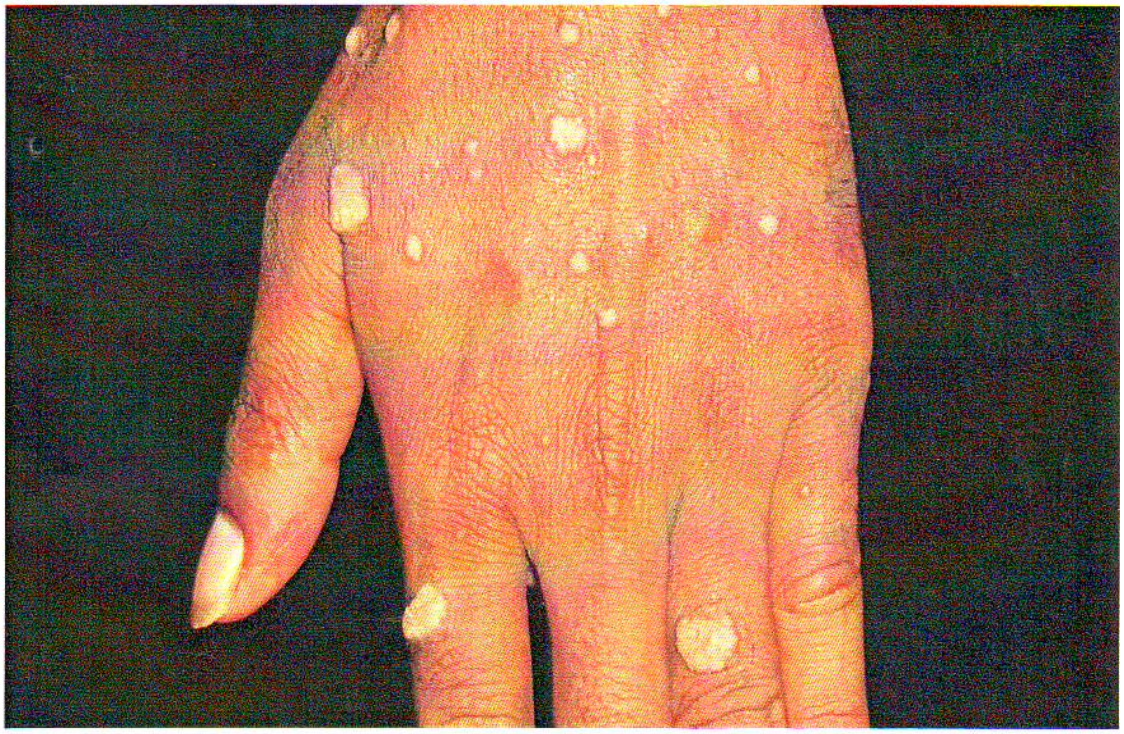

FIG 7: Multiple verrucated papules and plaques of Verruca vulgaris over the dorsum of the hand. Papules also extended till forearm and it was bilateral.

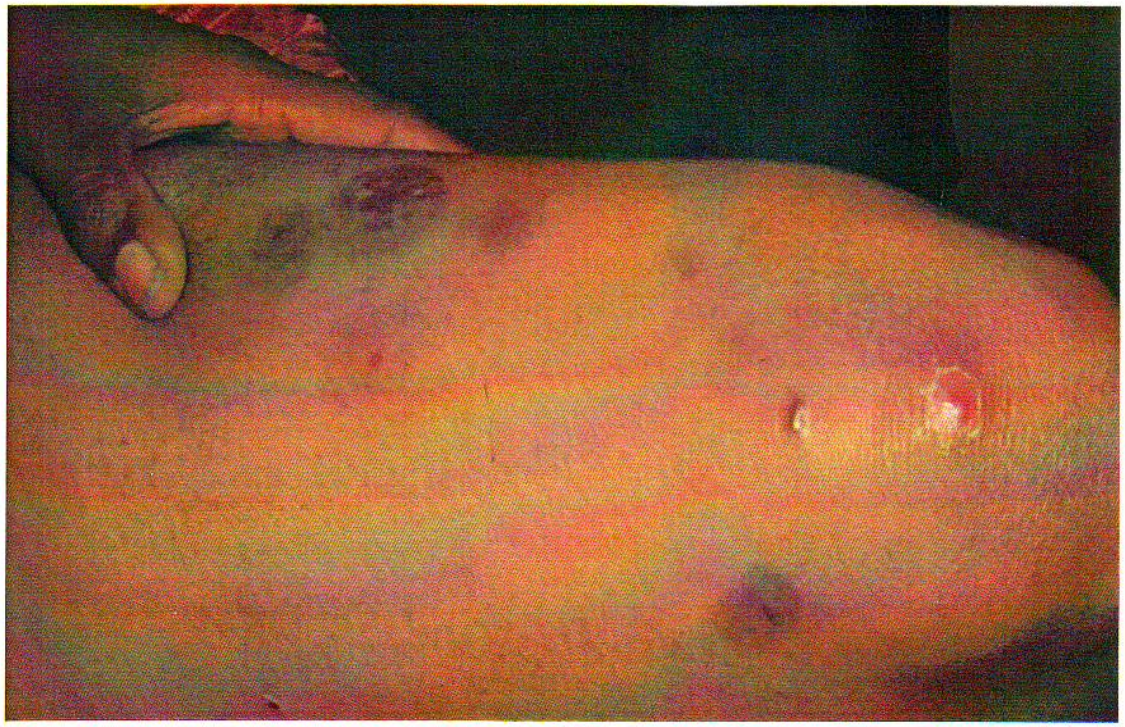

FIG 8: Multiple furuncles, some are fresh and some healed, seen over the left thigh. Furunculosis was recurrent and present all over the trunk and limbs

FIG 9: Healed carbuncle over the back of a female patient. It shows peripheral hyper pigmentation, and patient had itching.

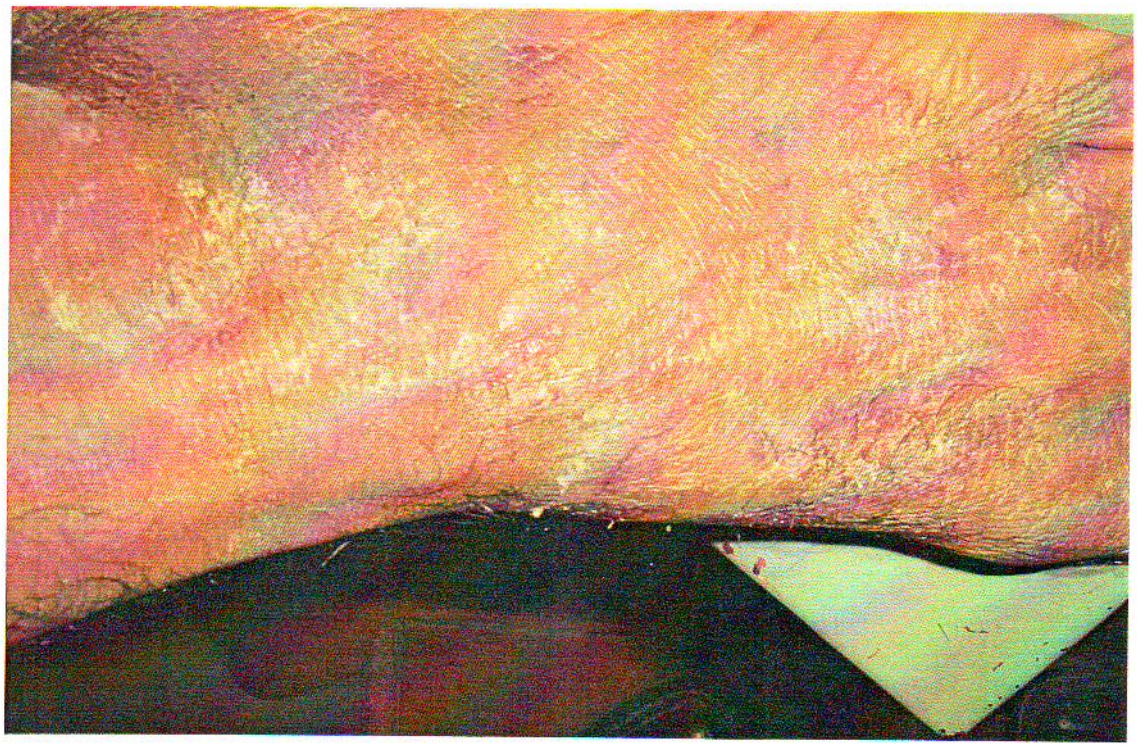

FIG 10: Tinea pedis showing scaly lesions with active border and central hyperpigmentation. Patient also had tinea unguium.

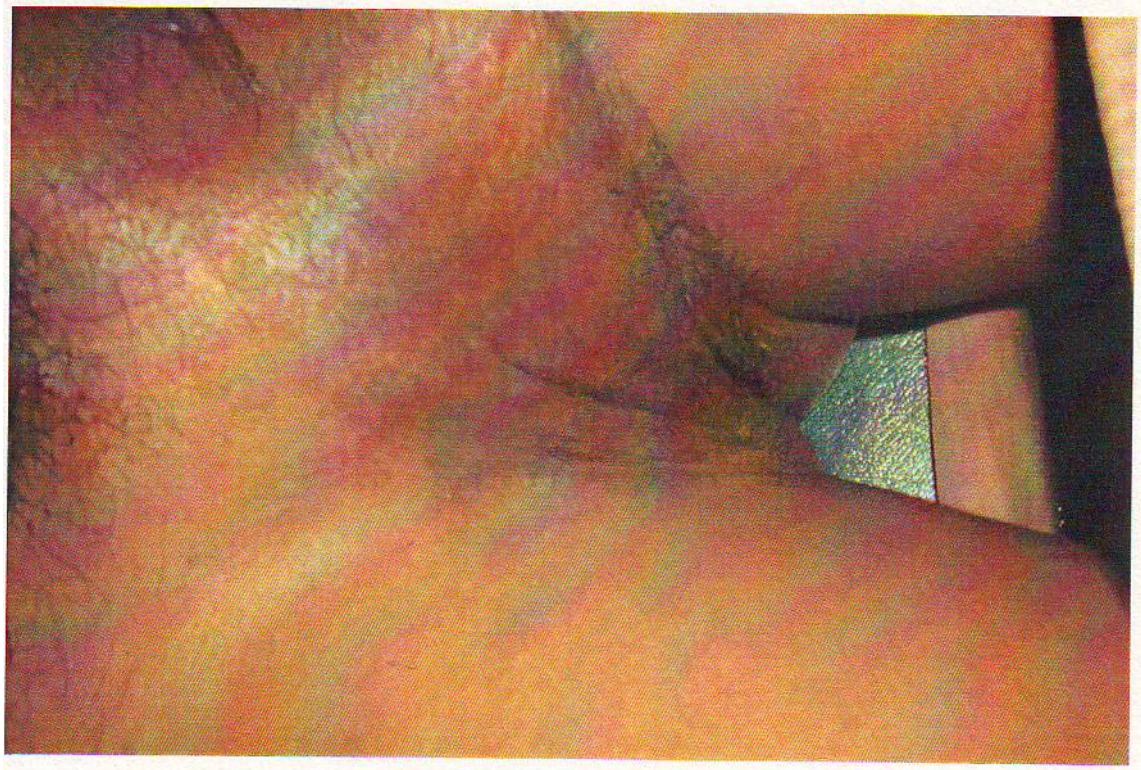

FIG 11: Tinea cruris

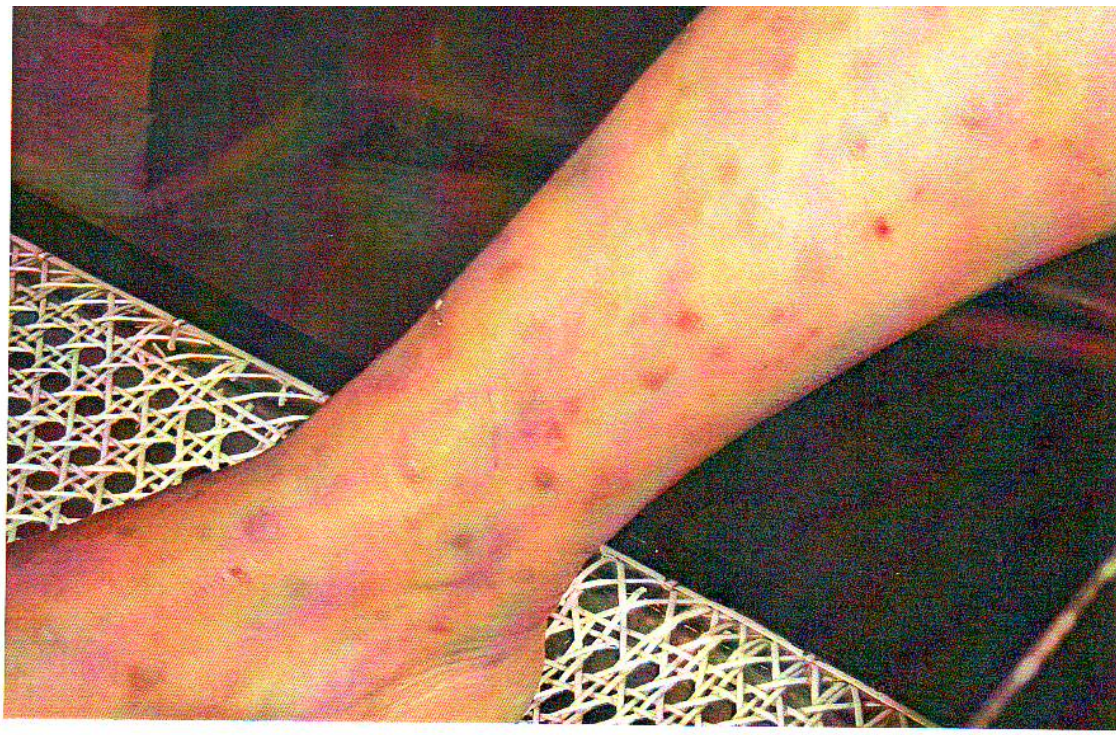

FIG 12: EOSINOPHILIC FOLLICULITIS. Showing multiple urticarial plaques and papules over the lower limb. This patient had fulfilled all the three criteria for the diagnosis of Eosinophilic folliculitis.

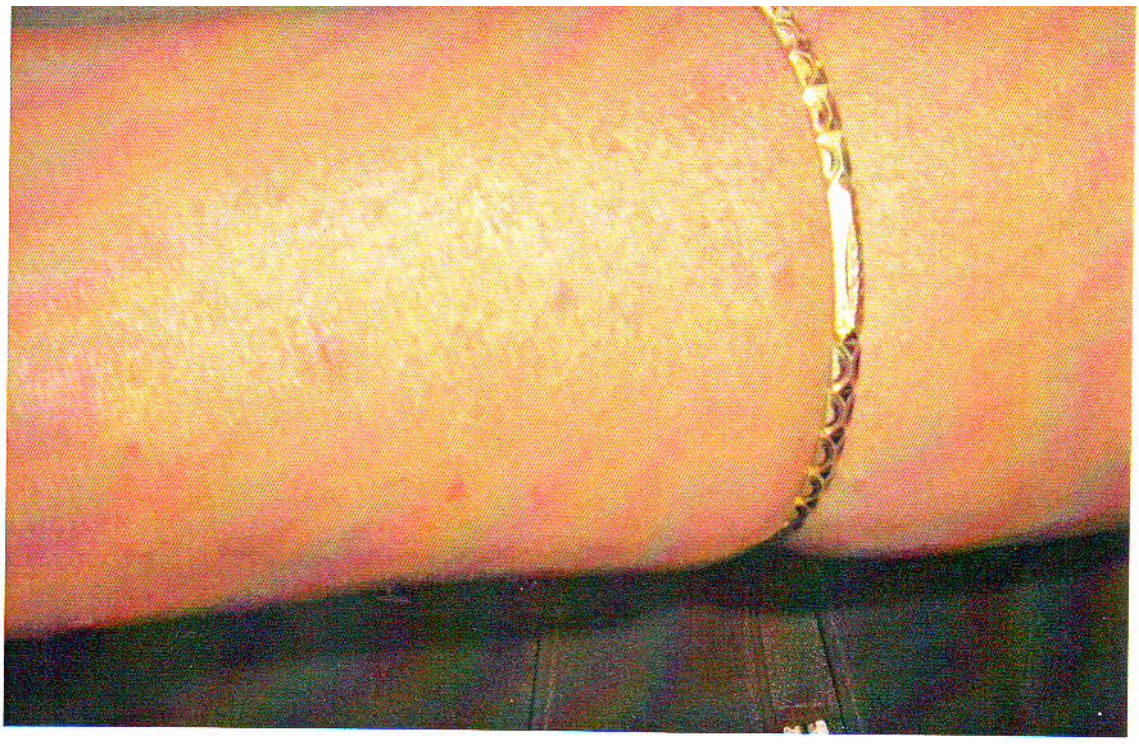

FIG 13: EOSINOPHILIC FOLLICULITIS. Showing multiple erythematous papules.

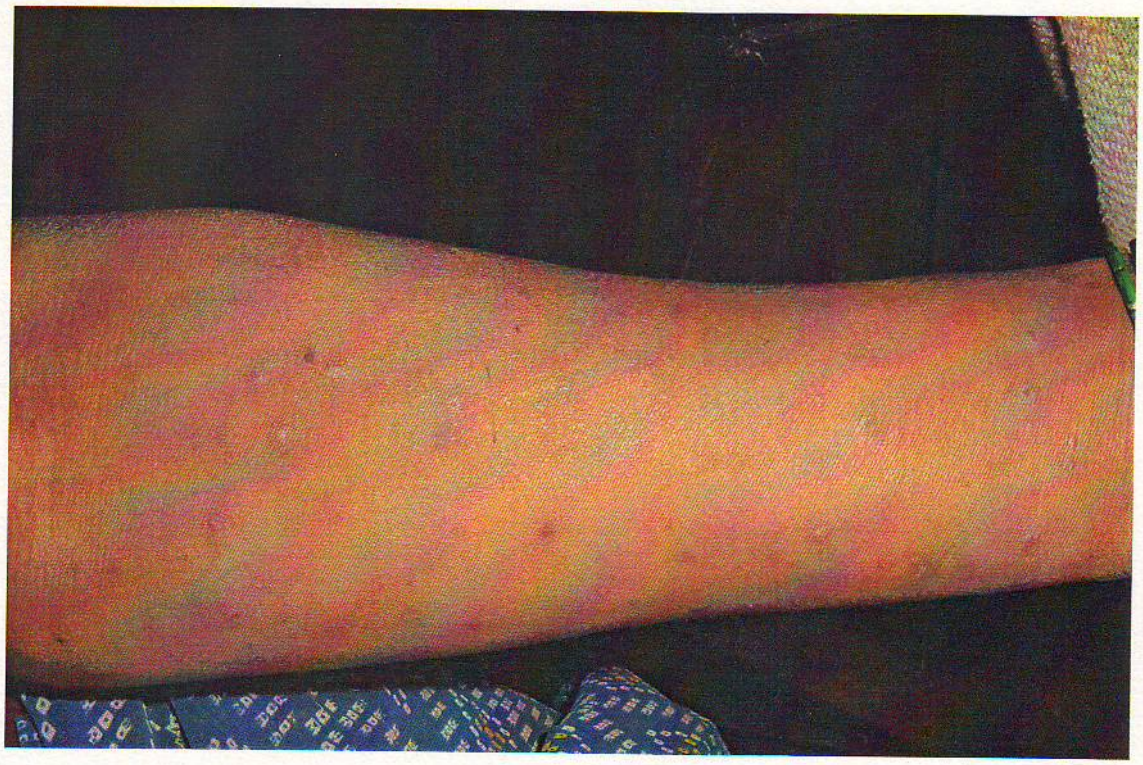

FIG 14: Pruritic papular eruptions (PPE)

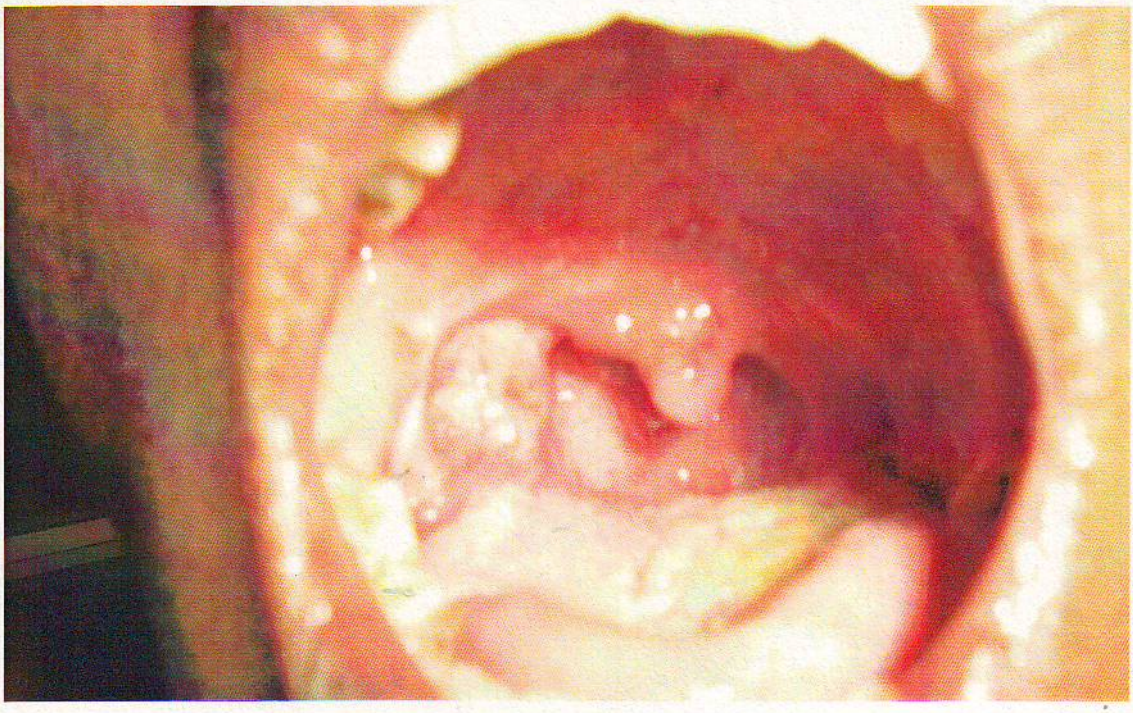

FIG 15: Oral candidiasis (pseudomembranous type), showing multiple curdy white patches over the fauces.

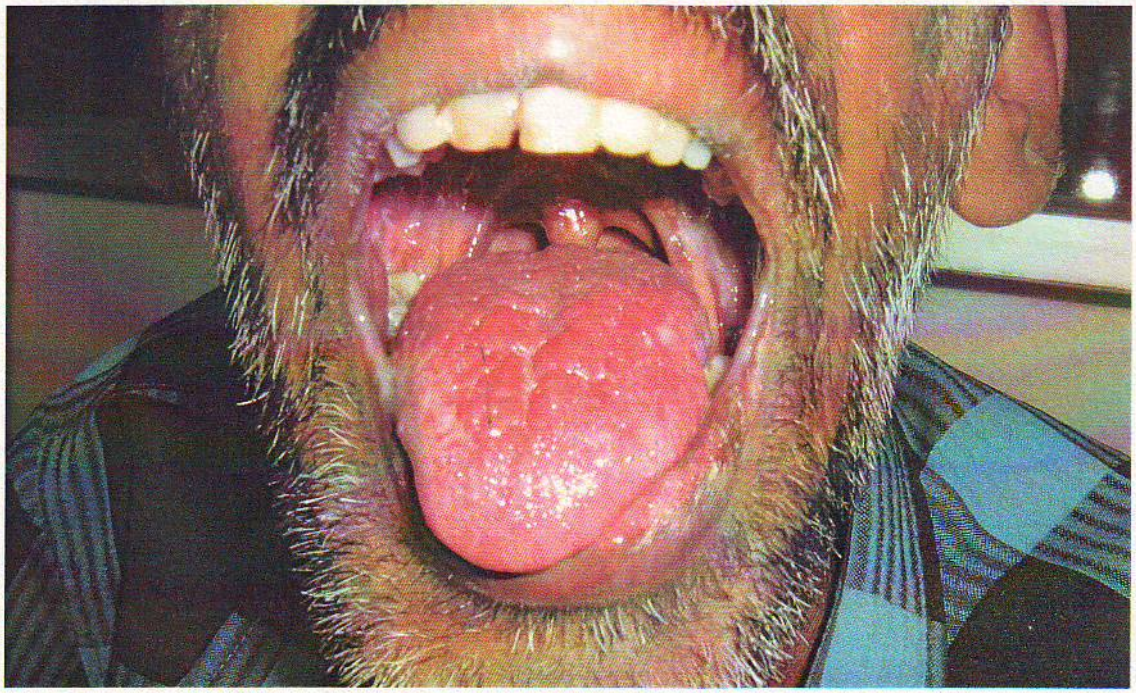

FIG 16: Oral candidiasis (Atrophic/erythematous type)

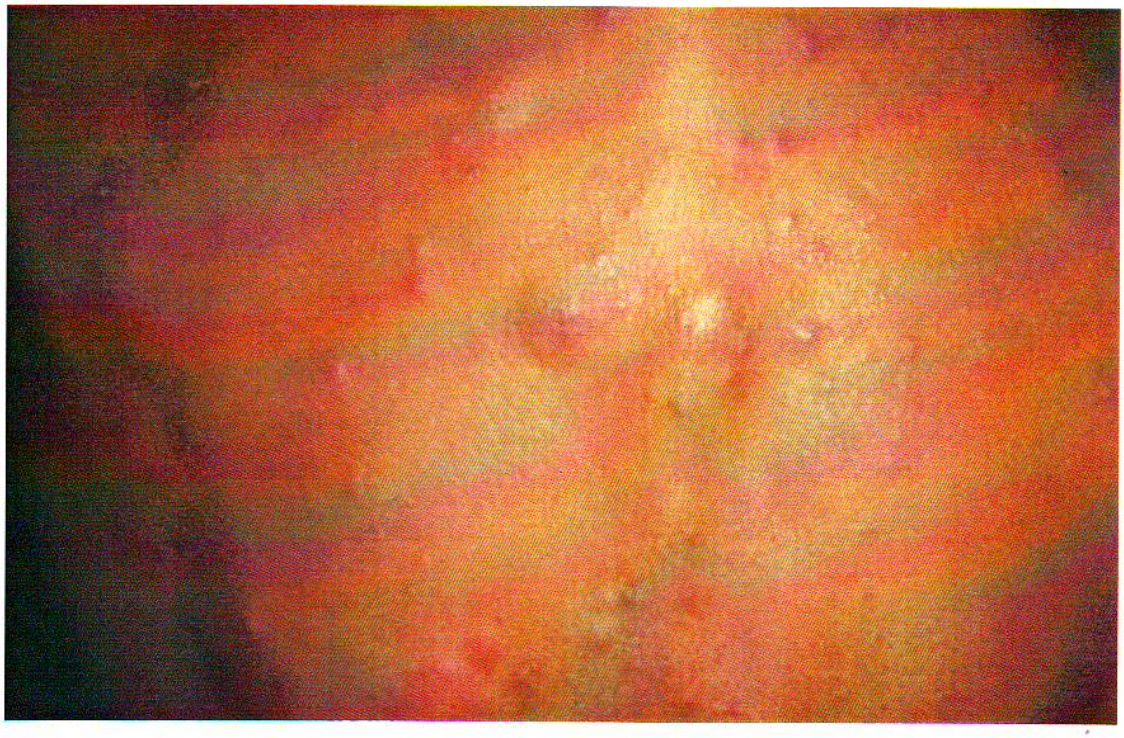

FIG 17: Drug eruptions. Erythema multiforme and acneform eruptions over the back, induced by nevirapine.

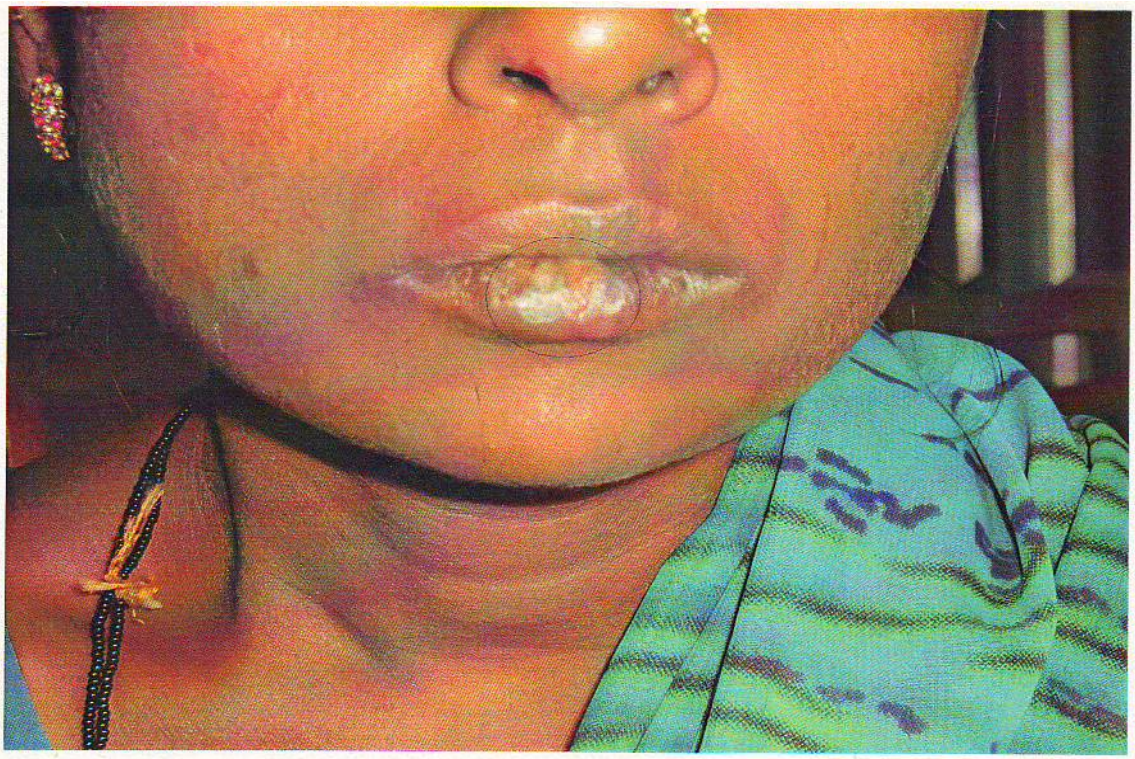

FIG 18: Actinic chelitis.

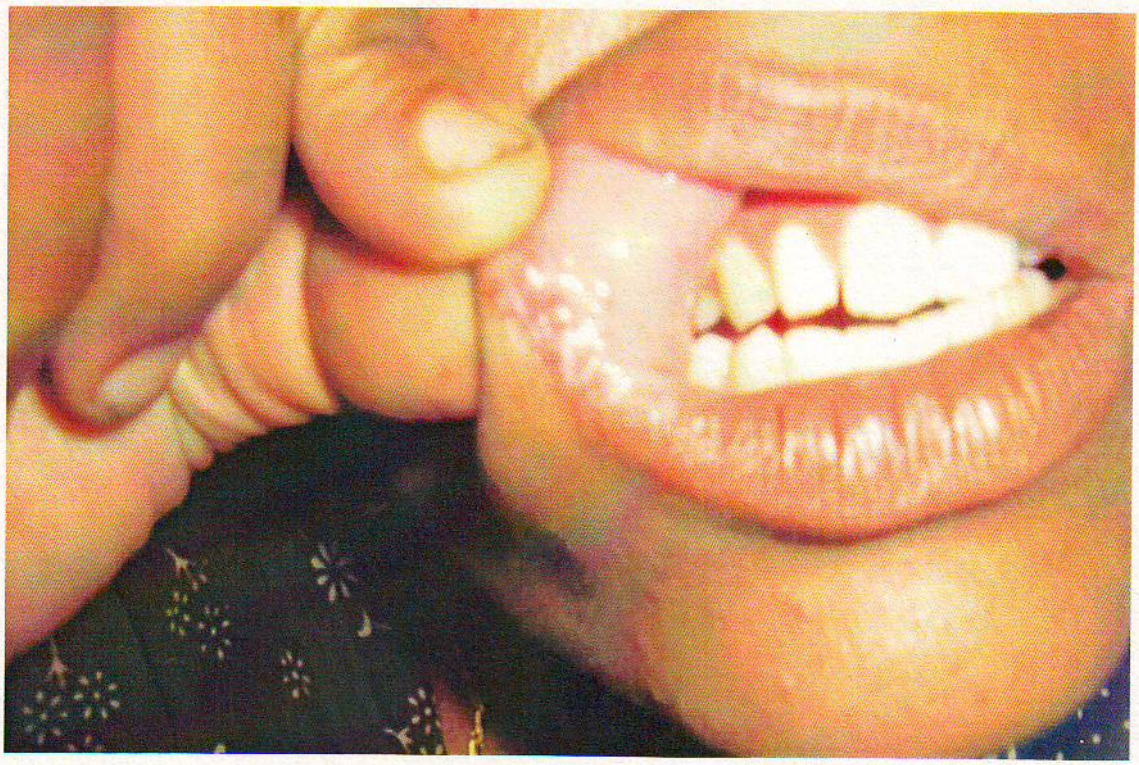

FIG 19: HERPES LABIALIS, Showing multiple vesicles over the left angle of the mouth

Conclusion

Oral Candidiasis was the leading presenting complaint followed by Molluscum Contagiosum, Condyloma Accuminata (seen only in male patients) and Multidermatomal Herpes Zoster. So any patient with these symptoms can be suspected as a case of HIV if other conditions are ruled out.

In correlation with CD4 cell count mucocutaneous manifestations increased with decreased CD4 cell count [Regression Coefficient (-0.31) with 0.64 standard error of estimate and p-value <0.05].

When dermatological lesions of patient who are on HAART was compared with that of non-HAART, there was significant reduction in the prevalence of dermatological viral infection in CAT 2[under HAART-chi square=5.134; p<0.023].But prevalence of bacterial and fungal infections showed no change [p=0.763(NS) and P=0.827(NS) respectively].This may be due to poor socioeconomic status and poor hygiene. Since the study mainly involved patients of lower socioeconomic status, we suggest further studies be conducted by involving patients of higher socioeconomic status matched for all other criteria. However HAART improves the quality of life in the HIV infected (Orlovic & Smego, 2009).

Abbreviations

Cat-1: (category-1) Patients directly presenting to skin and Std. dept. without knowing their HIV status, i.e., not on HAART
Cat-2: (category-2) Patients on HAART.
HAART- Highly active antiretroviral therapy
NACO-National AIDS Control Organisation
CD4+ -Cluster of differentiation 4
KOH-Potassium Hydroxide mount
STD-Sexually transmitted disease
HIV- Human Immunodeficiency Virus
AIDS-Acquired Immunodeficiency Syndrome
VDRL- Venereal Disease Research Laboratory
ELISA- Enzyme Linked Immunosorbent Assay
VCTC-Voluntary Counselling and Testing Centre
OI- Opportunistic Infection

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Table 1: Distribution of the study population according to age, gender, occupation and marital status

Variable	**Male**	**Female**	**Total**
Age (years)	**n=182**	**n=168**	**n=350**
16-20	7 (3.8%)	7 (4.2%)	14 (4%)
21-25	14 (7.6%)	35 (20.8%)	49 (14%)
26-30	42 (23.1%)	42 (25%)	84 (24%)
31-35	56 (30.8%)	49 (29.2%)	105 (30%)
36-40	21 (11.5%)	7 (4.2%)	28 (8%)
41-45	28 (15.3%)	14 (8.3%)	42 (12%)
46-50	14 (7.6%)	14 (8.3%)	28 (8%)
Total	**182 (52%)**	**168 (48%)**	**350**
Occupation			
Skilled	49 (26.9%)	28 (16.6%)	77 (22%)
Semiskilled	42 (23.1%)	7 (4.1%)	49 (14%)
Unskilled	42 (23.1%)	126 (75%)	168 (48%)
Agriculture	49 (26.9%)	7 (4.2%)	56 (16%)
Marital Status			
Married	133 (73.1%)	77 (45.8%)	210 (60%)
Unmarried	49 (26.9%)	7 (4.2%)	56 (16%)
Widow	-	77 (45.8%)	77 (22%)
Separated	-	7 (4.2%)	7 (2%)

Table 2: Prevalence of the viral opportunistic infections (OIs) among cat-1 (non-HAART) study population with mean CD4+Count

Disease	Male (n=84)	Female (n=91)	Total (n=175)	Mean CD4+Count
Herpes Zoster (HZ)	7 (8.3%)	21 (23.1%)	28 (16%)	273.2±149.39
Condyloma acuminatum	35 (41.7%)	--	35 (20%)	197±177.53
HSV genitalis	7 (8.3%)	21 (23.1%)	28 (16%)	211.5±150.46
Verruca Vulgaris	--	7 (7.7%)	7 (4%)	368±150.82
Molluscum contagiosum	21 (25%)	21 (23.1%)	42 (24%)	155.1±123.42
Total	70 (83.3%)	70 (76.9%)	140 (80%)	240.96±82.69

Table 3: Prevalence of the viral OIs among cat-2 (under-HAART) study population with mean CD4+Count

Disease	Male (n=98)	Female (n=77)	Total (n=175)	Mean CD4+Count
Herpes Zoster (HZ)	--	14 (18.1%)	14 (8%)	56±24.25
Condyloma acuminatum	14 (14.2%)	--	14 (8%)	319±227.39
HSV genitalis	-	7 (9.1%)	7 (4%)	282±132.14
HSV labialis	--	7 (9.1%)	7 (4%)	105±81.12
Verruca Vulgaris	7 (7.1%)	7 (9.1%)	14 (8%)	105.5±89.3
Total	21 (21.4%)	35 (45.4%)	56 (32%)	173.50±118.39

Table 4: Prevalence of the bacterial OIs among cat-1 (non-HAART) study population with mean CD4+Count

Disease	Male (n=84)	Female (n=91)	Total (n=175)	Mean CD4+Count
Furuncle	--	7 (7.6%)	7 (4%)	86±3.35
Carbuncle	--	7 (7.6%)	7 (4%)	146±3.74
Folliculitis	--	7 (7.6%)	7 (4%)	136±3.89
Abscess	--	7 (7.6%)	7 (4%)	69±8.79
Syphilis	7 (8.3%)	--	7 (4%)	280±4.18
Total	7 (8.3%)	28 (30.8%)	35 (20%)	143.40±82.99

Table 5: Prevalence of the bacterial OIs among cat-2 (under-HAART) study population with mean CD4+Count

Disease	Male (n=98)	Female (n=77)	Total (n=175)	Mean CD4+Count
Furuncle	7 (7.14%)	14 (18.2%)	21 (12%)	336.6±124.36
Carbuncle	--	-	-	
Folliculitis	14 (14.2%)	7 (9.1%)	21 (12%)	124±98.54
Total	21 (21.4%)	21 (27.3%)	42 (24%)	230±150.33

Table 6: Prevalence of the Fungal OIs among cat-1 (non-HAART) study population with mean CD4+Count

Disease	Male (n=84)	Female (n=91)	Total (n=175)	Mean CD4+Count
Tinea	7 (8.3%)	7 (7.6%)	14 (8%)	79±30.61
Onychomycosis	7 (8.3%)	-	7 (4%)	22±3.21
Pityriasis versicolor	7 (8.3%)	-	7 (4%)	46±4.82
Oral candidiasis	35 (41.6%)	14 (15.3%)	49 (28%)	150.8±98.3
Total	56 (66.6%)	21 (23.1%)	77 (44%)	74.45±56

Table 7: Prevalence of the Fungal OIs among cat-2 (under-HAART) study population with mean CD4+Count

Disease	Male (n=98)	Female (n=77)	Total (n=175)	Mean CD4+Count
Tinea	42 (48.9%)	21 (27.3%)	63 (36%)	133.35±125.7
Onychomycosis	-	7 (9.1%)	7 (4%)	112±40.76
Pityriasis versicolor	-	-	-	
Oral candidiasis	-	-	-	
Total	42 (48.9%)	28 (36.4%)	70 (40%)	122.68±15.09

Table 8: Prevalence of the non-infectious skin lesions among cat-1 (non-HAART) study population with mean CD4+Count

Disease	Male (n=84)	Female (n=91)	Total (n=175)	Mean CD4+Count
Xerosis	14 (16.7%)	--	14 (8%)	40±24.04
Eosinophillic folliculitis	--	14 (15.4%)	14 (8%)	199±106.12
Seborrhoeic dermatitis	14 (16.7%)	--	14 (8%)	95.5±58.54
Aphthous ulcer	--	7 (7.7%)	7 (4%)	172±70.23
Photodermatitis	--	14 (15.4%)	14 (8%)	87±69.3
Pityriasis rosea	7 (8.3%)	--	7 (4%)	502±150.33
Total	35 (41.7%)	35 (38.5%)	70 (40%)	182.58±167

Table 9: Prevalence of the non-infectious skin lesions among cat-2 (under HAART) study population with mean CD4+Count

Disease	Male (n=98)	Female (n=77)	Total (n=175)	Mean CD4+Count
Xerosis	14 (14.2%)	7 (9.1%)	21 (12%)	35.3±14.15
Seborrhoeic dermatitis	14 (14.2%)	21 (27.2%)	35 (20%)	74.6±46.77
Eosinophillic folliculitis	7 (7.1%)	--	7 (4%)	44±28.54
Aphthous ulcer	7 (7.1%)	--	7 (4%)	249±50.11
Pruritic papular eruptions	7 (7.1%)	21 (27.2%)	28 (16%)	94.25±15.08
Drug reaction				
Nevirapine rash	28 (28.6%)	--	28 (16%)	83.75±24.43
Lichenoid eruption	7 (7.1%)	7 (9.1%)	14 (8%)	56±39.29
Actinic chelitis	--	7 (9.1%)	7 (4%)	7±2.13
Contact allergic dermatitis	7 (7.1%)	--	7 (4%)	8±4.22
Total	91 (92.9%)	63 (81.8%)	154 (88%)	78.7±79.35

Table 10: Comparison of prevalence of viral OIs in Cat-1 and Cat-2

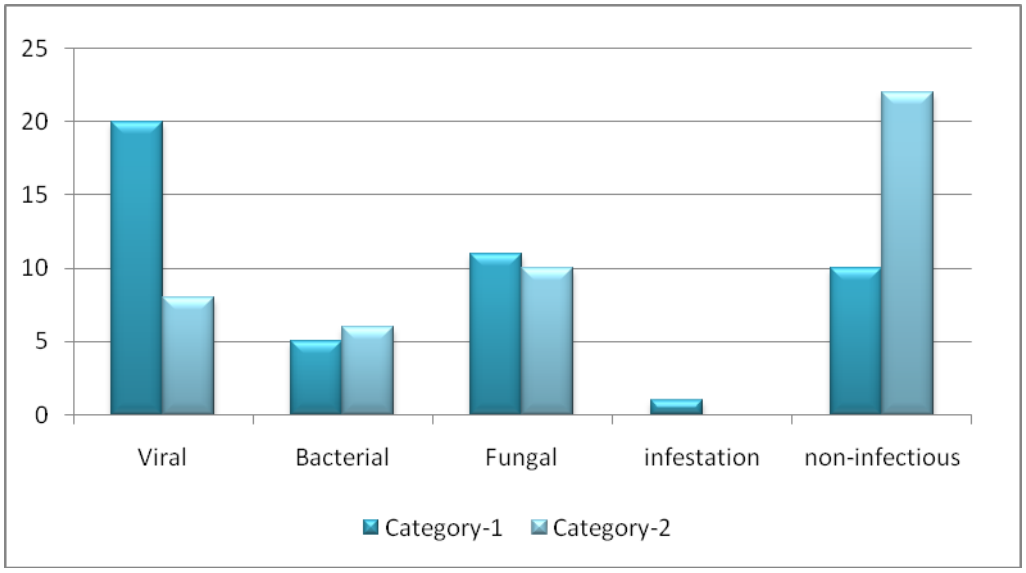
Disease	n=175 Cat-1 (non-HAART)	n=175 Cat-2 (HAART)	n=350 Total
Herpes Zoster (HZ)	28 (16%)	14 (8%)	42 (12%)
Condyloma acuminatum	35 (20%)	14 (28.57%) (8%)	49 (14%)
HSV genitalis	28 (16%)	7 (20%) (4%)	35 (10%)
HSV Labialis	-	7 (4%)	7 (2%)
Verruca Vulgaris	7 (4%)	14 (66.6%) (8%)	21 (6%)
Molluscum contagiosum	42 (24%)	-	42 (12%)
Total	140 (80%)	56 (32%)	196 (56%)

Table 11: Comparison of prevalence of bacterial OIs in Cat-1 and Cat-2

Disease	n=175 Cat-1 (non-HAART)	n=175 Cat-2 (HAART)	n=350 Total
Furuncle	7 (4%)	21 (12%)	28 (8%)
Carbuncle	7 (4%)	-	7 (2%)
Folliculitis	7 (4%)	21 (12%)	28 (8%)
Abscess	7 (4%)	-	7 (2%)
Syphilis	7 (4%)	-	7 (2%)
Total	35 (20%)	42 (24%)	77 (22%)

Table 12: Comparison of prevalence of Fungal OIs in Cat-1 and Cat-2

Disease	n=175 Cat-1 (non-HAART)	n=175 Cat-2 (HAART)	n=350 Total
Tinea	14 (8%)	63 (36%)	77 (22%)
Onychomycosis	7 (4%)	7 (4%)	14 (4%)
Pityriasis versicolor	7 (4%)	-	7 (2%)
Oral candidiasis	49 (28%)	-	49 (14%)
Total	77 (44%)	70 (40%)	147 (42%)



Graph 1

Table 13: Comparison of the prevalence of the non-infectious lesions among cat-1 and cat-2

Disease	**n=175 Cat-1(non-HAART)**	**n=175 Cat-2(HAART)**	**n=350 Total**
Xerosis	14 (8%)	21 (12%)	35 (10%)
Eosinophilic folliculitis	14 (8%)	7 (4%)	21 (6%)
Seborrhoeic dermatitis	14 (8%)	35 (20%)	42 (12%)
Aphthous ulcer	7 (4%)	7 (4%)	14 (4%)
Photodermatitis	14 (8%)	-	14 (4%)
Pityriasis rosea	7 (4%)	-	7 (2%)
Pruritic papular eruption (PPE)	-	28 (16%)	28 (8%)
Drug reaction	-	42 (24%)	42 (12%)
Actinic chelitis	-	7 (4%)	7 (2%)
Contact allergic dermatitis	-	7 (4%)	7 (2%)
Total	70 (40%)	154 (88%)	224 (64%)