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A study to find the correlation between mucocutaneous manifestations and CD4 counts among the newly diagnosed HIV individuals.

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Introduction: Skin disorders are common manifestations of HIV disease. A study was conducted to find the correlation between the degree of immunosuppression and the incidence of specific skin disorders in patients with HIV infection. **Materials and methods:** Study was conducted in the department of dermatology, SCB Medical College and Hospital, Cuttack from October 2010 to September 2012. Random sampling was considered in this study. Referred patients, after pretest counseling at ICTC Centre, were included and individuals who are on antiretroviral treatment were excluded. Relevant diagnostic tests were performed like scraping and KOH examination for the diagnosis of dermatophytoses and candidiasis, Tzanck smear for herpes infection, Darkfield microscopy for diagnosis of a syphilitic ulcer, Biopsy is done wherever required. CD4 count was done as per the guidelines. **Results:** A total of 150 (100%) participants were included, the male-female ratio was 1.8. Age-wise, 57% (85) were included in 31–45 group and 15% were unmarried. Fungal infections constitute 17.9% of total mucocutaneous disorders followed by bacterial infections (10.5%), viral (8.09%) and parasitic (6.7%) infestations. **Conclusion:** Age group, 31–45 years is the commonest for HIV infection. Fungal infections (dermatoses) of the skin were most common followed by bacterial folliculitis, herpes zoster, and scabies. Except for viral infections, the mean CD4 counts were <200cells/cu mm.

Keywords: AIDS, CD4 counts, HIV, Infections

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Introduction

AIDS, the Acquired Immunodeficiency Syndrome is a fatal illness caused by a retrovirus known as Human Immunodeficiency Virus (HIV), was first recognized in the United States in the summer of 1981 [1]. The onset of the HIV epidemic in India was heralded by the detection of HIV in commercial sex workers (CSW) and a case of AIDS in Chennai and Mumbai respectively in 1986.

Progressive immune dysfunction is the hallmark of this viral infection. The RNA retrovirus infects CD4+ cells, most notably T helper cells, and leads to a profound alteration of immune system function that predisposes patients to numerous opportunistic infections, malignancies, and neurologic disease. Patients progress to AIDS when CD4+ cell counts fall below 200cells/cumm or certain clinical diseases manifest [2]. HIV is present in an infected person in all the body fluids, the highest concentration of virus being present in blood and genital secretions.

CD4 cell count is one of the essential investigations in the clinical evaluation and the management of HIV infected individuals. However, the standard test for CD 4 cell count requires sophisticated laboratory facilities, expertise and is expensive. It is not readily available in resource-poor settings [3]. The skin is richly endowed with CD4 T cells.

Cutaneous manifestations are prominent affecting up to 90% of HIV infected persons [4,5]. The skin lesions or combinations of skin conditions are so unique that the diagnosis of HIV/AIDS can often be suspected from the skin examination alone [4]. The skin conditions also tend to appear at a specific stage in the progression of HIV and like CD4 T cell count, is an indicator of the development of AIDS and overall survival.

Skin disorders are common manifestations of HIV disease. Patients with HIV disease are at an increased risk of a variety of common cutaneous conditions and suffer a wide range of infectious, inflammatory and malignant skin conditions. Decreased mucocutaneous immunity often accounts for the earliest clinical symptoms and signs in HIV infected patients.

It has become increasingly clear that cutaneous disorders are not only associated with terminal immunodeficiency but also occur throughout the course of HIV infection. More than 90% of HIV seropositive patients develop skin or mucous membrane conditions at some time during their Disease and in many of the skin is the first organ affected.

As HIV disease progresses, these manifestations become more severe and varied, causing physical discomfort and psychological distress in otherwise relatively healthy individuals. In advanced immunosuppression, opportunistic pathogens can present as atypical cutaneous lesions presenting challenges in both diagnosis and treatment.

With these, a study was conducted to find the correlation between the degree of immunosuppression and the incidence of specific skin disorders in patients with HIV infection.

Materials and Methods

Settings: Study was conducted in the department of dermatology, SCB Medical College and Hospital, Cuttack.

Duration of study: The study was conducted from October 2010 to September 2012.

Sampling method: Random sampling was considered in this study.

Inclusion criteria: In suspected patients and referred patients, after pretest counseling screened at ICTC Centre of our hospital with three different types of tests (Enzyme Immune Assay or Rapid test) which are based upon a different antigen preparation or principle.

Exclusion criteria: Individuals who are on antiretroviral treatment, who did not submit the consent were not considered in the study.

Sample size: All the individuals who satisfy the inclusion criteria during the study period were included in the study.

Ethical approval: Study protocol was approved by the institutional ethical committee.

The complete history of each patient was taken. The patient underwent a thorough physical examination with emphasis on mucocutaneous manifestations.

Findings were recorded on proforma. Relevant diagnostic tests were performed like scraping and KOH examination for the diagnosis of dermatophytoses and candidiasis, Tzanck smear for herpes infection, Darkfield microscopy for diagnosis of a syphilitic ulcer, Biopsy is done wherever required. The patients were treated according to the WHO/CDC guidelines.

A complete record along with baseline CD4 count and CD4 count is done before the appearance of specific dermatological manifestations was recorded in proforma enclosed herewith. The data were analyzed using SPSS Version 21.0. Statistics in the form of mean and percentage were included in the study.

Results

In this study total, 150 (100%) participants were included. Among these 96 (64%) were male and 54 (36) were female participants; the male-female ratio was 1.8. Age-wise, 5% (8) participants were included in the < 15 years group, 27% (40) were included in the 16-30 years group, 57% (85) were included in 31-45 years group and 11% (17) in >45 years age group.

Gender wise, in male, 2% (3) participants were included in < 15 years group, 8% (12) were included in 16-30 years group, 43% (68) were included in 31-45 years group and 9% (13) in >45 years age group; among the female, 3% (5) participants were included in <15 years group, 19% (28) were included in 16-30 years group, 11% (17) were included in 31-45 years group and 2.5% (4) in >45 years age group (Table 1).

Table-1: Age and gender-wise distribution of the study participants; n (%).

Age	Male	Female	Total
< 15	3 (2)	5 (3)	8 (5)
16-30	12 (8)	28 (19)	40 (27)
31-45	68 (43)	17 (11)	85 (57)
>45	13 (9)	4 (2.5)	17 (11)
Total	96 (64)	54 (36)	150 (100)

Out of the 150 (100%) study participants, 15% (23) were unmarried, 66% (99) were married, 11% (16) were widowed, 3% (4) divorced and this was not applicable for 5% (8) of the participants. In the male, 11% (17) were unmarried, 47% (70) were married, 2.5% (4) were widowed, 1.3% (2) divorced and this was not applicable for 2% (3). Among the female, 4% (6) were unmarried, 19% (29) were married, 8% (12) were widowed, 1.3% (2) divorced and this was not applicable for 3.3% (5) (Table 2).

Table-2: Distribution of study participants according to marital status; n (%).

Marital status	Male	Female	Total
Unmarried	17 (11)	6 (4)	23 (15)
Married	70 (47)	29 (19)	99 (66)
Widowed	4 (2.5)	12 (8)	16 (11)
Divorced	2 (1.3)	2 (1.3)	4 (3)
Not applicable	3 (2)	5 (3.3)	8 (5)
Total	96 (64)	54 (36)	150 (100)

There were 30 patients with bacterial infections, and it constitutes 10.5% of total mucocutaneous disorders. Out of this folliculitis was the most common bacterial infection seen in 19 patients (64%), out of which 63% with CD4 count <200 cells/cumm.

This was followed by 3 patients (10%) with impetigo, 2 patients (6.6%) each with abscess and ecthyma, 1 each with cellulitis, Hansen's disease, cutaneous TB and primary syphilis (Table 3).

Table-3: Correlation between CD4 count and bacterial skin infections among the study participants; n (%).

Bacterial infections	CD4 Count (cells/cu mm)			Total
	<200	200-500	>500	
Folliculitis	12 (40)	7 (23)	0	19 (63)
Abscess	1 (3.3)	1 (3.3)	0	2 (7)
Impetigo	1 (3.3)	2 (7)	0	3 (10)
Cellulitis	1 (3.3)	0	0	1 (3.3)
Ecthyma	1 (3.3)	1 (3.3)	0	2 (7)
Hansens	1 (3.3)	0	0	1 (3.3)
Cutaneous TB	1 (3.3)	0	0	1 (3.3)
Syphillis	1 (3.3)	0	0	1 (3.3)
Total	19 (63)	11 (37)	0	30 (100)

Fungal infections were seen in 51 patients constitutes 17.9% of total mucocutaneous disorders.

Table-4: Correlation between CD4 count and fungal infections among the study participants; n (%).

Fungal infections	CD4 Count (cells/cumm)			Total
	<200	200-500	>500	
T. Cruris	7 (14)	2 (4)	2 (4)	11 (22)
T. Corporis	6 (12)	2 (4)	0	8 (16)
T. Manuum	1 (2)	0	0	1 (2)
T. Pedis	2 (4)	0	0	2 (4)
Intertrigo	2 (4)	1 (2)	1 (2)	4 (8)
Oral Candidiasis	11 (22)	4 (8)	1 (2)	16 (31)
Vulvovaginal candidiasis	4 (8)	2 (4)	0	6 (12)
Candidial balanoposthitis	2 (4)	1 (2)	0	3 (6)
Total	35 (69)	12 (23.5)	4 (8)	51 (100)

Oral candidiasis most common found in 16 patients (31%) with the majority (69%) with CD4 count <200 cells/cumm, 8 patients (15.7%) with T. corporis and 6 patients (11.76%) with vulvovaginal

Candidiasis, followed by 3 patients (5.88%) candidal balanoposthitis, 4 patients (7.84%) with intertrigo, 2 patients (3.92%) with T. pedis, 1 patients with T. manuum (1.96%) (Table 4).

There were 23 patients, around 8.09% of total mucocutaneous manifestations with viral infections. Out of which 7 patients (30.4%) with herpes genitalis, 6 patients (26.08%) with herpes zoster, 5 patients (21.7%) herpes labialis, 3 patients (13%) with molluscum contagiosum, 2 patient (8.7%) with the genital wart. A total of 48% of viral infection patients with <200 CD4 cells/cu mm (Table 5).

Table-5: Correlation between CD4 count and viral infections among the study participants; n (%).

Viral infections	CD4 Count (cells/cu mm)			Total
	<200	200-500	>500	
H. Zoster	4 (17)	2 (8.5)	0	6 (26)
H. Genitalis	4 (17)	2 (8.5)	1 (4.5)	7 (30)
H. labialis	2 (8.5)	3 (13)	0	5 (22)
M. Contagiosum	1 (4.5)	2 (8.5)	0	3 (13)
Genital Wart	0	2 (8.5)	0	2 (9)
Total	11 (48)	11 (48)	1 (4.5)	23 (100)

Parasitic infestations are seen in 19 patients, 6.7% of total mucocutaneous manifestations, out of which 17 patients (89.4%) patients with scabies, 1 patient (5.26%) each with demodicidosis and pediculosis. 57.9% of scabies patients having CD4 count <200 cells/cu mm (Table 6).

Table-6: Correlation between CD4 count and parasitic infections among the study participants; n (%)

Parasitic infestations	CD4 Count (cells/cumm)			Total
	<200	200-500	>500	
Scabies	11 (58)	4 (20)	2 (10)	17 (89)
Demodicidosis	1 (5)	0	0	1 (5)
Pediculosis	0	1 (5)	0	1 (5)
Total	12 (63)	5 (26)	2 (10)	19 (100)

Discussion

Cutaneous manifestations of HIV infection have been the subject of intense scrutiny because the skin is the most commonly affected organ in HIV infected individuals. Infectious and non-infectious HIV induced skin diseases may not only serve as the marker of HIV infection but also as a marker of the stage of HIV disease and level of immunosuppression which is very important in resources poor countries where the most frequent evaluation of immunity with CD4 count cannot be Done due to economical reasons.

The present study further revealed a correlation of the degree of immune suppression (as measured by CD4 count) and the incidence of specific skin disorders in patients with HIV/AIDS alongside establishing the clinical mucocutaneous indicators of the underlying immune status.

Out of 150 cases, 96 (64%) were male and 54 (36%) were female participants. The high male prevalence is consistent with the studies of Shobhana et al [5], Singh H et al [6], X-Huang et al [7], Josephine et al [8]. The high prevalence of in male accounted for migratory nature of their occupations and under-reporting of infection among the female.

In this study, 31–45 years is the most common age group affected (56.6%) followed by 15 – 30 years (26.6%). These findings were comparable with Bravo et al [9]. These investigators reported that the prevalence was high (51%) in the 30-39 years age group. This seems to be related to high-risk sexual behavior in this age group. Among 150 patients 73% of males and 54% of females were married. Shobhana A et al. showed 65% of males and 95% of females were married [5].

The majority of the patients (42%) were unskilled laborers, which were mostly included daily wage workers, followed by 24.6% of patients who were skilled laborers. This is because the hospital renders free service and hence is attended more by people belonging to the middle and low economic group. Among the women, the majority (24) patients were housewives. This again emphasizes the main route and source of infection in females i.e. through heterosexual contact with their spouse.

Bacterial infections were identified in 30 patients constitutes 10.5% of total mucocutaneous disorders. Folliculitis was the most common manifestations (6.6%). This was comparable with the study by Sud et al. and Srikant KP et al., 8% of folliculitis lesions were reported [9,10]. The mean CD4 count in bacterial infection was 220.2 cells/cu mm, this was reported to be 245.33 cells/cu mm by Jing et al [11].

Dermatophytoses was diagnosed in 8.4% of the study members. Whereas dermatological manifestations were reported to be 13% by Shobhana et al [5] and 11.7% by Attili et al [12]. In this study, Candidiasis was the common (49%) fungal infection. Among the fungal infected

Individuals, in the majority (68%) the CD4 count was <200 cells/cu mm.

The mean CD4 count for oropharyngeal candidiasis in this study was 178.62 cells/cu mm and the mean CD4 counts were reported to be 150.8cells/cu mm [10]. In the available studies also, oral candidiasis was the most commonly reported mucocutaneous manifestations [5, 7, 11, 12]. The mean CD4 count for fungal infections was 187.71 cells/cu mm and it was reported as 178 cells/cu mm by Kumarswamy et al. study [13].

In this study, there were 23 patients (8.09%) with viral infections. The mean CD4 count was 260.84 cells/cu mm. Among the viral infections, herpes simplex virus causing herpes genitalis and herpes labialis were frequent. Herpes gentalis was diagnosed in 2.4% of patients. Jing et al. also reported similar findings [11].

The mean CD4 count in herpes genitalis infected individuals was 232.42 cells/cu mm and it was reported as 187 cells/ cu mm, 211.5 cell/cu mm respectively by Shobhana et al [5] and Srikant KP et al [10]. Most cases improved with Oral Acyclovir therapy. The majority (57%) of herpes genitalis cases were having CD4 count <200 cells/cumm.

Herpes Zoster was seen in 6 patients (2.1%), this was lower than the study by Shobhana et al [5]. This difference may be due to under-reporting of cases. The mean CD4 count was 168.33 cells/cu mm and in the available literature, the mean CD 4 counts were 152 cells/cu mm and 138.3 cells/cu mm respectively by Wahard et al [14] and Attili et al [12].

Molluscum contagiosum was found in 3 patients (1.05%) with mean CD4 count of 217 cells/cu mm. The mean CD4 counts were similar as reported by Nnoruka et al [15]. One patient in this study had giant molluscum over face and one with multiple giant lesions surrounding the orbital area. Genital wart was found in 2 cases and the CD4 count was 423 cells /cu mm and 407cells/cu mm, /respectively.

Parasitic infestations were identified in 6.6% of patients. Scabies was the predominant (17; 5.9%) parasitic infection. In the literature, the incidence of scabies varies between 3-6% [15,16,17]. But Attili et al. revealed similar findings [12]. The mean CD4 count in this study was 197.94 cells/cu mm, this was lower than the available studies [12].

Conclusion

Active age group, 31-45 years is the commonest for HIV infection and most of them were unskilled laborers. Fungal infections of the skin were most common among the infectious dermatoses, with mean CD4 count 187.7cells/cu mm in bacterial infections folliculitis was the commonest infections, mean CD4 count was 204.4cells/cu mm. Herpes zoster is the common viral skin infection, the mean CD4 count was 262.44cells/cu mm. Scabies was found in 5.9% with mean CD4 count 197.9cells/cu mm.

Limitations

Small sample size, short study period are the limitations of this research.

What does this study add to the existing knowledge

Below 45 years is the common age group for HIV infections and fungal skin infections are most common followed by bacterial, viral and parasitic infections. In fungal infections, oral Candidiasis is the predominate followed by T. Cruris. Folliculitis is a common bacterial infection in HIV patients.

Author's contribution

Dr. Subhodha Kumar Patjoshi: Sample collection, Benchwork, statistical analysis, paper writing

Dr. T Jaya Chandra: Literature survey, Paper writing, data analysis

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