

Original Research Article

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## Profile of Opportunistic Infections and CD4 Count in HIV/AIDS Patients in and Around Vijayapur, Karnataka, India

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### ABSTRACT

#### Keywords

Human immunodeficiency virus, Opportunistic infections, CD4 count, Tuberculosis, AIDS.

#### Article Info

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Human immunodeficiency virus (HIV) is responsible for depletion of CD4 cell count. Thus resulting in the rise of opportunistic infections (OI) leading to increase in morbidity and mortality in HIV infected patients. The aim of the study was to observe the opportunistic infections and CD4 count in HIV/AIDS patients. The work was done in Microbiology, Al-Ameen Medical College Vijayapur, Karnataka from January 2012 – December 2012. The relevant investigations were carried out along with CD4 count. Among total 1254 HIV patients it was seen males had increase preponderance than females. Heterosexual route been commonest mode of transmission. Common opportunistic infections were pulmonary tuberculosis 44.66%, Candidiasis 23.92%, Cryptosporidial diarrhea 19.46%, Herpes zoster 3.19%, Cryptococcal meningitis 2.80%, *Pneumocystis jiroveci pneumonia* 1.99% and other miscellaneous infections 3.98%. CD4count in 41.70% was between 201-500/ $\mu$ l followed by 29.10% between 101-200/ $\mu$ l. The present study demonstrates the profile of opportunistic infections and CD4 count in HIV/AIDS patients.

### Introduction

As per National AIDS Control Organisation of India, in 2013 prevalence of AIDS was 0.27. ([www.ndtv.com.HIV/AIDS](http://www.ndtv.com.HIV/AIDS)). HIV/AIDS has remained as global pandemic with cases being reported from virtually every country. Worldwide the total numbers of cases are 34.2 million (UNAIDS, 2011). Around 3.97 million were reported as cases of HIV infection in India (Sharma *et al.*, 2003). Opportunistic infections are noted complications of Human immunodeficiency virus (HIV) infection leading to high

mortality and morbidity (Kaplan *et al.*, 1996; Moore *et al.*, 1996). Prevalence of various infections varies in different areas of the country and also in different countries (Ayyagari *et al.*, 1999).

### Objectives

We conducted this study the profile of OIs and CD4 count in HIV/AIDS patients helping in introduction of prophylaxis and therapeutic measures for patient's betterment.

## Materials and Methods

Our study was carried out in Al-Ameen Medical College and Government District hospital, Vijayapur, Karnataka India. A total of 1254 HIV positive patients from January 2012 to December were included in the study. Before starting antiretroviral therapy (ART), CD4 count estimation was done at the ART Centre District hospital, Vijayapur.

## Exclusion criteria

Patients reporting with other immunosuppressive disorders, on immunosuppressive therapy and pediatric age group were excluded from the study.

## Ethical consideration

Al-Ameen institutional ethical committee gave ethical clearance for our study. Individual informed consent collected from each patient.

All the HIV positive 1254 patients were subjected to various tests or investigations for detection of opportunistic infections. Their HIV test and CD4 count estimation was done according to NACO guidelines. CD4 count was done using 5-fluorescence-activated cell sorting count flow cytometer (Becton, Dickenson, Sanjose, Calif., USA) (NACO guidelines, 2007). For all the patients ART was started as per NACO guidelines. The opportunistic infections were recorded in these patients. Various samples depending on the system involved were collected with sterile precautions and relevant investigations were done as per the standard guidelines (Bailey and Scott, 2002).

The diagnosis of tuberculosis was made by Ziehl Neelsen stain, chest x-ray and history along with symptoms. The Candida infection was diagnosed by Gram stain, KOH,

fungal culture was done on SDA and specific tests related to Candida were done to identify the species of candida. Cryptosporidiosis and other parasitic infections were diagnosed by modified Z.N. stain. Viral infections like Herpes simplex and Herpes zoster detected by clinical presentation and Tzanck smear. Fungal infection like Cryptococcal meningitis was identified by India ink preparation, culture on SDA, agglutination test and biopsy. *Pneumocystis jiroveci pneumonia* cases were confirmed by clinical features, chest x-ray, silver methamine stain and arterial blood gas analysis. Other culture media like blood agar, chocolate agar, Lowenstein Jensen media, MacConkey agar and Sabouraud's dextrose agar were inoculated to grow microbial pathogens.

## Results and Discussion

Out of 1254 HIV patients 683(54.47%) were males and 571(45.53%) females. Male patients between age group of 31-40 years were maximum 265(21.13%). In female patients maximum were in 31-40 years, 235(18.74%) (Table 1).

Majority of the HIV patients belonged to coolie group both in male and among female patients 900(71.77%), about 196(15.62%) were Housewives (Table 2).

The commonest route of transmission was Heterosexual in 1000(79.74%) followed by 125(9.97%) spouse being positive, parenteral route 75(5.98%) respectively. Around 54(4.31%) the route of transmission was unknown (Table 3).

Pulmonary tuberculosis was been noted as commonest opportunistic infection in the study 560(44.66%), Candidiasis in 300(23.92%), Cryptosporidial diarrhea in 244(19.46%), Herpes zoster in 40(3.19%), Cryptococcal meningitis in 35(2.80%),

*Pneumocystis jiroveci pneumonia* in 25(1.99%) and other miscellaneous infections accounted in 50(3.98%) patients (Table 4).

CD4 count being maximum ranging between 201-500/ $\mu$ l in 523(41.70%) followed by 101-200/ $\mu$ l in 365(29.10%), 51-100/ $\mu$ l in 221(17.62%), 0-50/ $\mu$ l in 102(8.13%) and >500/ $\mu$ l in 43(3.42%) (Table 5).

This study was done to observe the opportunistic infections and CD4 count in HIV patients which can help to adopt prophylactic measures to reduce various opportunistic infections.

Our study shows the common age of presentation of patients between 31-40years 500(39.87%). Moore *et al.*, in 1996 showed 48% were in the age group between 31 to 40 years. In another study by Praveen R. Shahapur in 2014 showed 31-40 years age group was found to be most commonly (41.66) involved among men.

Most common route of transmission noted was heterosexual route 1000(79.74%). Gupta in 2007, Praveen R. Shahapur in 2014 and Kumar in 2012 also reported heterosexual route as the commonest route of transmission of HIV infection.

**Table.1** Age and Sex distribution

| Age         | Male=n | %      | Female=n | %      | Total = % |
|-------------|--------|--------|----------|--------|-----------|
| 1-10 years  | 00     | 00     | 00       | 00     | 00        |
| 11-20 years | 30     | 2.4%   | 20       | 1.59%  | 3.99%     |
| 21-30 years | 240    | 19.14% | 135      | 10.77% | 29.91%    |
| 31-40years  | 265    | 21.13% | 235      | 18.74% | 39.87%    |
| 41-50years  | 112    | 8.93%  | 120      | 9.57%  | 18.5%     |
| 51-60years  | 30     | 2.39%  | 50       | 3.99%  | 6.38%     |
| 61-70years  | 5      | 0.4%   | 10       | 0.79%  | 1.19%     |
| 71-80years  | 1      | 0.08%  | 1        | 0.08%  | 0.16%     |
| Total       | 683    | 54.47% | 571      | 45.53% | 100       |

**Table.2** Occupation of the patient

| Occupation     | Male | Female |
|----------------|------|--------|
| Agriculture    | 77   | 00     |
| Employed       | 05   | 00     |
| Business       | 26   | 01     |
| Coolie         | 527  | 373    |
| Driver         | 47   | 01     |
| Housewife      | 00   | 196    |
| Others/student | 01   | 00     |
| Total          | 683  | 571    |

**Table.3** Mode of transmission

| Sl.no | Route of transmission                        | n=1254 | %      |
|-------|--|--------|--------|
| 1     | Heterosexual                                 | 1000   | 79.74% |
| 2     | Spouse being positive                        | 125    | 9.97%  |
| 3     | Intravenous drug abusers or parenteral route | 75     | 5.98%  |
| 4     | Not known                                    | 54     | 4.31%  |

**Table.4** Opportunistic infections in HIV/AIDS patients

| Sl.no | Opportunistic infection                | n=1254 | %      |
|-------|--|--------|--------|
| 1     | Pulmonary tuberculosis                 | 560    | 44.66% |
| 2     | Candidiasis                            | 300    | 23.92% |
| 3     | Cryptosporidial diarrhea               | 244    | 19.46% |
| 4     | Herpes zoster                          | 40     | 3.19%  |
| 5     | Cryptococcal meningitis                | 35     | 2.80%  |
| 6     | <i>Pneumocystis jiroveci pneumonia</i> | 25     | 1.99%  |
| 7     | Miscellaneous infections               | 50     | 3.98%  |

**Table.5** CD4 count in HIV/AIDS patients

| Sl.no | CD4 count       | n=1254 | %      |
|-------|-----------------|--------|--------|
| 1     | 0-50cells/µl    | 102    | 8.13%  |
| 2     | 51-100cells/µl  | 221    | 17.62% |
| 3     | 101-200cells/µl | 365    | 29.10% |
| 4     | 201-500cells/µl | 523    | 41.70% |
| 5     | >500cells/µl    | 43     | 3.42%  |

Our study showed evidence of pulmonary tuberculosis among 560(44.66%) of HIV patients followed by Candidiasis 300 (23.92%), Cryptosporidial diarrhea 244 (19.46%), Herpes zoster 40 (3.19%), Cryptococcal meningitis 35 (2.80%), *Pneumocystis jiroveci pneumonia* 25 (1.99%) and other infections 50 (3.98%). Kumaraswamy in 1995 also reported commonest opportunistic infections as tuberculosis in 61%, Candidiasis 41%, diarrhea 16% and fungal infections of skin 16%.

Misra in 1998 observed tuberculosis 62% incidence, Candidiasis 57% and chronic diarrhea 47% among the opportunistic infections.

Sharma SK in 2004 showed tuberculosis to be the commonest opportunistic infections 71%, Candidiasis 39.3%, *Pneumocystis jiroveci pneumonia* 7.4%, Cryptococcal meningitis and cerebral toxoplasmosis 3.7% each.

Vinay KV in 2012 observed tuberculosis in 64%, Candidiasis 30%, *Pneumocystis jiroveci pneumonia* 18%, Herpes infection 12% and Cryptosporidial diarrhea 10% and Cryptococcal meningitis 2% as the common opportunistic

infections.

The CD4 count in the study shows following CD4 count between 201-500 cells/µl was seen among 523(41.70%), 101-200 cells/µl in 365(29.10%), 51-100 cells/µl in 221(17.62%), 0-50 cells/µl in 102(8.13%) and >500 cells/µl in 43(3.42%).

Similar findings were reported by Srirangaraj in 2011 and Ravinder Kaur in 2016.

Our conclusion is majority of HIV patients were male among sexually active and working age group. Commonest route of transmission is Heterosexual route of transmission of HIV infection. Tuberculosis and Candidiasis were observed as the maximum cases reported among opportunistic infections. Depletion of CD4 cells results in causing more opportunistic infections. To delay the progression to AIDS, prolong the life span and prevent complication we have to have early diagnosis and adopt prompt measures for treating the opportunistic infections.

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