

## Spectrum of opportunistic infections among HIV/AIDS patients of Hyderabad, AP, India

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### ABSTRACT

**Background:** The staggering worldwide evolution of HIV pandemicity is a major concern today as it causes a greater loss of productivity than any other diseases. HIV infection leads to profound immune deficiency and patients become highly susceptible to opportunistic infections (OIs). HIV epidemic in India is heterogenous in nature, both in terms of routes of transmission as well as geographical spread.

**Aims:** 1. Determine prevalence of opportunistic infections among HIV seropositive patients and their relation to CD4 count and to focus on the routes of transmission. 2. Analyze the route of transmission.

**Materials and Methods:** This is a single centre prospective study including all the patients attending AIDS care centre during the period of 10th January 2012 to November 2012.

**Results:** Among 111 patients included in this study in AIDS & TB care centre, mean age was 29 years, 61.26% (68 patients) were male, 38.73% (43 patients) were female. Mean CD4 cell count of study group was 267.11 and of patients on ART reduced subsequently to 151.47 cells per microlitre. Among opportunistic infections prevalence of TB was 18.9% and uncomplicated URTIs, Candidiasis, Chronic diarrhea, Skin fungal infections, UTIs, STIs were respectively 22.5%, 10.8%, 5.4%, 3.6%, 2.7%, 2.7%. Most predominant route being heterosexual transmission in males (89.7%) and females (95.34%) followed by vertical transmission (4.4% in males and 4.65% in female). Homosexual transmission is 1.8% overall (both male) and I.V. drug abuse 1.8% overall (both male).

**Conclusion:** The frequency of OIs among HIV/AIDS patients of ART centre has got a similar linear relation with CD4 cell count. This study reports data will serve as matrix for future evaluation. It is concluded that upper respiratory tract infections, pulmonary tuberculosis, candidiasis are the commonest opportunistic infections in the HIV seropositive patients in the present study group.

**Key Words:** Opportunistic infections (OIs), Human Immunodeficiency virus (HIV), Tuberculosis (TB)

## 1. INTRODUCTION

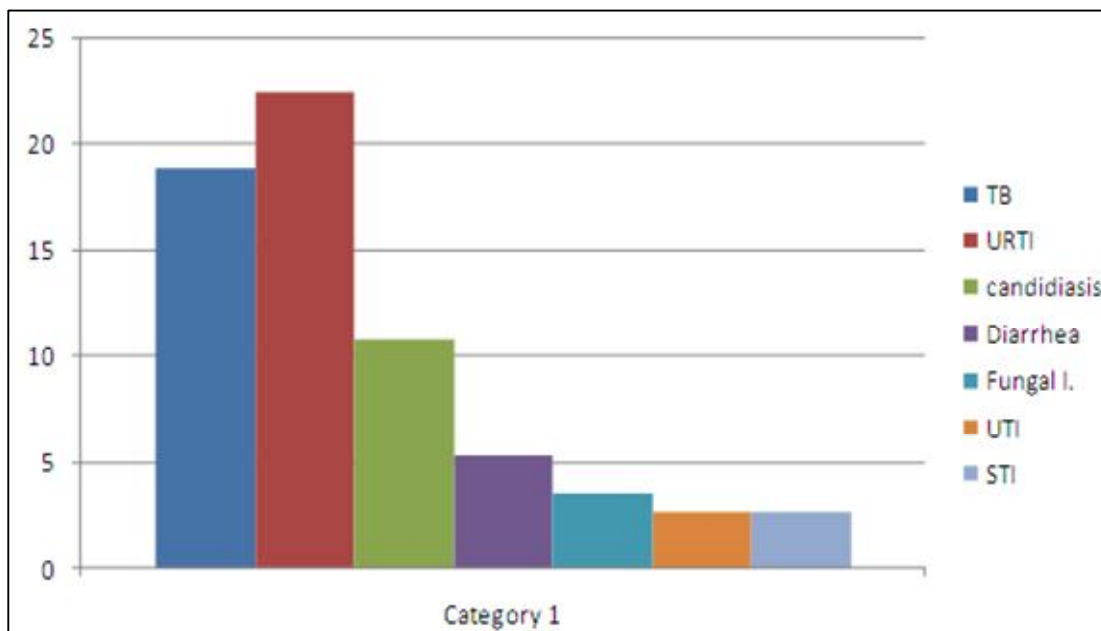
Human Immunodeficiency Virus (HIV) is the most devastating plague facing us as the 21st century begins. According to report of commission of AIDS in Asia the staggering worldwide evolution of HIV pandemicity is a major concern today as it causes greater loss of productivity than any other disease, and it is likely to push an additional 6 million households into poverty by 2015 unless national responses are strengthened (Report of commission of AIDS in Asia, 2008). According to report on the global AIDS epidemic by joint UN program, young people aged 15-24 account for estimated 45% of new HIV infections worldwide (Joint United Nations Program on HIV/AIDS/WHO, 2008). The first case of HIV/AIDS was detected in India in Tamil Nadu and ever since, spread of HIV/AIDS across nation has been relentless. There are 2.29 million people living with HIV/AIDS in India with an estimated adult prevalence of 0.31%. According to NACO: annual report, out of the estimated number of PLHA (people living with HIV/ AIDS), 39% are females, 3.5% children (Ministry of Health and Family Welfare NACO, 2010-11). According to the annual report of National AIDS Control Organization, Government of India the magnitude of the infection is second only to that of South Africa (Annual Report 2009-2010 by Department of AIDS Control, 2009). According to Mukhopadhy et al the progressive destruction of immune system by chronic HIV infection leading to progressive fall in the level of CD4 cells (<200/ $\mu$ l to <50 /  $\mu$ l) is known to be responsible for the occurrence of infections (eg. Tuberculosis, Candidiasis, parasitic diarrhea etc) by a variety of opportunistic microorganisms (Mukhopadhy et al. 1999). Death in HIV infection is mostly due to OIs. Pulmonary disease is one of the most common complication of HIV infection and approximately 1/3rd of all AIDS related deaths are related to TB (Harrisons principle of Internal Medicine). Merchant et al., (2001) from Mumbai reported that among OIs, pulmonary and extrapulmonary Tb was 24.47% and skin lesions, chronic diarrhea, oral candidiasis, recurrent LRTI, pneumocystis pneumonia were 22.10%, 15.08%, 14.73%, 8.42% and 3.88% respectively. In another study, poll from Karnataka reveal that 39.03% were Tb, recurrent diarrhea is 30.99%, oral candidiasis 21.13% and recurrent bacterial pneumonia 12.68%. Sharma et al reported higher prevalence of Tb (71.1%) among hospitalized HIV patients in a tertiary care hospital in Delhi. HIV infection is predominantly sexually transmitted and most common mode of infection, particularly in developing countries is heterosexual transmission including India. The widespread use of effective chemoprophylaxis for OIs and the use of HAART has resulted in delay of onset of AIDS, longer survival and change in the pattern of OIs in developed world. The present study was undertaken to estimate the specific OIs, there relation with CD4 count and to focus on routes of transmission in secondary ART centre.

## 2. METHODS

This is a single centre prospective study including all the patients attending AIDS care centre during the period of 10th January 2012 to November 2012. These patients were already diagnosed HIV positive. All the patients who were registered were included in this study after taking written consent. Every patient had a monthly follow up. These patients were thoroughly examined and investigated extensively for diagnosis of OIs. According to Centre for Disease Control and Prevention, a specific OI was diagnosed on basis of standard clinical definition and by laboratory procedures (Mmwr Morb Mortal Weekly Report, 1999). Patients were advised to initiate ART when their CD4 cell count was less than 250 per ml. According to existing guidelines of NACO, and ART drugs were supplied from ART centre. CD4 counts were estimated by FACS count flowcytometer every 6 monthly. Stool samples were processed for the investigation of parasitic pathogens. Parasite detection was done as per the standard protocol. Direct wet mount preparation (saline and iodine) and wet preparation from formal ether concentrated samples were used for the detection of protozoan trophozoites, cysts and helminthic eggs and larva. For the detection of coccidian parasites, smears of stool samples were prepared and stained with modified acid fast method (Baveja et al. 2001, Gracia et al. 2002). Early morning expectorated sputum samples were collected in sterile containers. For the detection of bacterial pathogens, samples were processed for Gram's stain, Zeihl and Nelson (ZN) stain and aerobic culture on selective and enrichment media (Lowenstein Jenson media, Chocolate agar, Macconkey agar) as per the standard methods. As by Collee et al., (1989) the bacterial isolates were identified using standard microbiological techniques. Two oral swabs were taken from each patient. One swab was used for wet mount (10% KOH, i.e. potassium hydroxide) and Gram stain. The other swab was inoculated on Sabouraud's Dextrose Agar (SDA) with antibiotics. The growth obtained was identified for yeasts as per the standard protocol by manual of medical mycology, NIMS and Global hospital, including germ tube test, chlamyospore formation, sugar assimilation, sugar fermentation and urease test (Manual of Medical Mycology, VI National Conference of Society for Indian Human and animal Mycology, 2006). All the data was entered by use of standardised collection form that documented age, sex, mode of transmission, date of HIV detection, presenting symptom and OIs, CD4 counts, different blood investigations and treatment. Data entry, data base management and analysis was done with the use of SPSS17. Descriptive statistics were used to calculate frequency mean, median, mode and standard deviation.

**Table 1**

Percentage of opportunistic infections in HIV/ AIDS patients



### 3. RESULTS

Among 111 patients included in this study in AIDS & TB care centre, mean age was 29 years, 61.26% (68 patients) were male, 38.73% (43 patients) were female. Mean CD4 cell count of study group was 267.11 and of patients on ART reduced subsequently to 151.47 cells per microlitre.

#### 3.1. Incidence of opportunistic infections

##### 3.1.1. Tuberculosis

Among opportunistic infections prevalence of TB was 18.9% that is it was seen in 21 patients out of 111 total patients (Table 1). Among TB patients 57.14% (12 out of 21 patients) were having PTB and 42.86% (9 out of 21 patients) were having EPTB. In this study we have found that most TB infections were present among patients having CD4 count below 350 and mean count were 127.68 and 170.71 in PTB and EPTB respectively.

##### 3.1.2. Uncomplicated RTIs

Uncomplicated RTIs were seen most commonly that is in 25 patients out of 111 i.e. 22.5% incidence among OIs.

##### 3.1.3. Candidiasis

Candidiasis is also seen as a common opportunistic infection in our study group with 10.8% incidence among OIs, that is it was seen in 12 patients out of 111 (Figure 1,2).

##### 3.1.4. Chronic Diarrhea

Chronic diarrhea was seen in 5.4% patients that is 6 patients among our study group of 111 patients.

##### 3.1.5. Skin Fungal Infections

Skin fungal infections were seen in 3.6% of patients that is 4 out of 111 total study group.

##### 3.1.6. Urinary Tract Infections

UTIs were seen in 2.7% patients that is 3 among 111 total patients.

##### 3.1.7. Sexually Transmitted Infections

STIs were seen in 2.7% patients that is 3 out of our 111 study group patients.



**Figure 1**  
 Oropharyngeal candidiasis



**Figure 2**  
 Mucosal Candidiasis

### 3.2. Route of Transmission

Most predominant route was heterosexual transmission. In males it is seen in 89.7% male patients i.e. 61 out of 68 patients and in females 95.34% i.e. 41 out of 43 patients. It is followed by vertical transmission seen in 4.4% male population i.e. 3 out of 68 patients and 4.65% female population i.e. 2 out of 43 patients. Homosexual transmission is 1.8% overall seen in 2 out of 111 patients, both male and i.v. drug abuse 1.8% overall seen in 2 out of 111 patients, both male.

## 4. DISCUSSION

AIDS and TB care centers are care and support centers for HIV/AIDS patients. As these are having in patient treatment facilities almost all patients are given that. During the study period the average age group was 29 years and male: female ratio was 1.58:1. On evaluation we have found among OIs TB was very common at 18.9% and candidiasis 10.8%. Among TB patients 57.14% (12 out of 21 patients) were having PTB and 42.86% (9 out of 21 patients) were having EPTB. In this study we have found that most TB infections were present among patients having CD4 count below 300 and mean count were 127.68 and 170.71 in PTB and EPTB respectively. Among other OIs, RTIs was very common with 22.5%. It has been observed that 66.6% of HIV infected patients had any one of the OIs and lower baseline CD4 count 190.91 in comparison to 321.48 in patients without any OIs. OIs were more prevalent when CD4 count fell below 300. In our study the most common mode of transmission in our state is heterosexual.

It is concluded that upper respiratory tract infections, pulmonary tuberculosis, candidiasis are the commonest opportunistic infections in the HIV seropositive patients in the present study group. The present study reflects that among HIV or AIDS frequency of OIs is less but it has a similar linear relationship with CD4 cell count. The cause of fewer incidences is maybe due to inclusion of all admitted patients in the study, though all these patients were symptomatic and reported to health facility for treatment. The natural history of OIs has changed during the HAART era and incidence of all OIs is markedly reduced. Improved hygienic practices, regular examination and appropriate antimicrobial prophylaxis can reduce the substantial morbidity and mortality caused by opportunistic infections in patients with HIV infections. With better knowledge and diagnosis of the opportunistic infections, clinicians and health planners can treat HIV patients more effectively. This will contribute to increased life expectancy among HIV seropositive patients. The relationship of our HIV patients with their nutritional status and BMI could not be evaluated. But this study once again proves that spectrum of OIs among various patient groups varies significantly.

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