

A Clinical Study on Opportunistic Infections among HIV/AIDS Patients Admitted in the Department of General Medicine of a Tertiary Care Hospital

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ABSTRACT

Introduction: Human immunodeficiency virus (HIV) virus, causative agent in acquired immunodeficiency syndrome, is fast becoming a major threat in the Indian subcontinent, with an estimated 3.7 million persons being infected with HIV. HIV infection is complicated by various opportunistic infections (OIs) such as tuberculosis (TB), candidiasis, herpes zoster, *Pneumocystis jirvoceii*, cytomegalovirus (CMV) etc. This study carried out to know the clinical profile of HIV patients who require admission.

Material and methods: The aim of this study to determine the spectrum of opportunistic infections in adult AIDS patients. A total of 132 patients were tested for spectrum of opportunistic infections. All the specimens were processed as per standard procedures to detect bacterial, fungal, parasitic and viral infections.

Results: Among 132 patients, 34.84% were females, 63.63% males and 1.49% were transgender males. High proportions of patients were observed in 28-37 years of agegroup and heterosexual route was the most common mode of transmission. TB (50%) is the most frequent OI followed by candidiasis (49%), pneumocystis (16%) and others.

Conclusions: Respiratory system was the most common system involved by OIs. Early diagnosis and prompt treatment of opportunistic infections is important before development of severe immunodeficiency to prevent serious and fatal outcome.

Keywords: HIV/AIDS, Anti Retroviral Therapy, Opportunistic Infections

living with HIV are beginning to organize themselves for advocacy and activism; epidemiologic, interventional, and clinical research have moved forward.

Diagnosis of HIV infection remains a challenge. There are unresolved ethical, technical, and programmatic issues around voluntary counseling and testing. Availability of highly active antiretroviral therapy is not an issue since antiretroviral drugs are manufactured in the country and exported elsewhere, but their affordability and the feasibility of monitoring patients taking the drugs are in question.

Before the widespread use of potent combination antiretroviral therapy (ART), opportunistic infections (OIs), which have been defined as infections that are more frequent or more severe because of immune suppression in HIV-infected persons, were the principal cause of morbidity and mortality in this population. In the early 1990s, the use of chemoprophylaxis, immunization, and better strategies for managing acute OIs contributed to improved quality of life and improved survival.¹ However, the widespread use of ART starting in the mid-1990s has had the most profound influence on reducing OI-related mortality in HIV-infected persons in those countries in which these therapies are accessible and affordable.¹

Despite the availability of ART, OIs continue to cause considerable morbidity and mortality for three primary reasons: 1) many patients are unaware of their HIV infection and seek medical care when an OI becomes the initial indicator of their disease; 2) certain patients are aware of their HIV infection, but do not take ART because of psychosocial or economic factors; and 3) certain patients are prescribed ART, but fail to attain adequate virologic

INTRODUCTION

AIDS (Acquired Immuno Deficiency Syndrome) is a fatal illness caused by a retrovirus known as Human Immunodeficiency virus (HIV). This disorder was first recognized in the United States in 1981 among homosexual men. In India, first case of HIV disease was documented in 1986. Although it is estimated that there are 4 million cases of HIV infection in India, the general consensus is that there are growing localized epidemics. The challenge to the country's infrastructure to respond to this epidemic and the issues of stigma and discrimination faced by HIV-infected persons appear daunting. After initial denial, the government set up the National AIDS Control Organization, which initiated a large-scale surveillance program for prevalence of HIV infection throughout all the states of India. The National AIDS Control Organization also brought significant improvements to blood supply safety in the country. The non governmental sector is active in prevention and care; people

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How to cite this article: Nagender Devulapally, Deepak Pandharpurkar, B. Gouthami, Gudikandula Krishna. A clinical study on opportunistic infections among HIV/AIDS patients admitted in the department of general medicine of a tertiary care Hospital. International Journal of Contemporary Medical Research 2019;6(4):D4-D8.

DOI: <http://dx.doi.org/10.21276/ijcmr.2019.6.4.26>

and immunologic response because of factors related to adherence, pharmacokinetics, or unexplained biologic factors. Thus, although hospitalizations and deaths have decreased since the implementation of ART, OIs remain a leading cause of morbidity and mortality in HIV-infected persons.² Clinicians must be knowledgeable about optimal strategies for prevention and management of OIs to provide comprehensive high-quality care for these patients.

The aim of this study to determine the spectrum of opportunistic infections in adult AIDS patients.

MATERIAL AND METHODS

Source of data

Patients with HIV/AIDS satisfying inclusion and exclusion criteria admitted in the Department of General Medicine, Gandhi hospital over a period of one year that is from August 2016 to July 2017.

Sample size: 132 patients.

Inclusion criteria

Patients who are HIV positive aged > 18 years and admitted in Department of general medicine.

Exclusion criteria

Patient refusal or inability to provide informed consent

Methodology

Sample of 132 cases admitted in Gandhi hospital during the study period were selected. All procedures and interventions have been established only after obtaining

adequate/ appropriate consent in a prescribed form. Ethical clearance has been obtained from the Ethical clearance committee chaired by the Principal Gandhi Medical College, Secunderabad, in a prescribed certificate. Upon enrollment in the study, written consent was obtained and duly signed by the patients in a prescribed format.

After inclusion in the study in each case a thorough history was taken followed by a detailed examination and the observations were recorded.

RESULTS

132 cases that satisfied the inclusion criteria were considered for the study. Of the 132 individuals analyzed, 84 (64%) were males, 46 (34%) were females and 2(2%) were Transgender. Of these 132 HIV infected, 131 (99.9%) were HIV 1 reactive and 1 (0.75%) were HIV 2 reactive.

The incidence of OIs was significantly high in patients who were less educated and this directly indicates the impact of level of education on the transmission of the disease, as education is directly related to the level of awareness.

In this study total of 164 opportunistic infections were found comprising of bacterial, fungal, parasitic and viral infections. Among different opportunistic infections, bacterial infections were seen in 56.06% patients, followed by fungal in 45.45%, viral in 10.6% and parasitic in 9.09% respectively.

The commonest infection among the opportunistic infections was Tuberculosis, followed by Candidiasis and Cryptosporidial diarrhea. Herpes zoster was also seen in an increased frequency. Equal percentages of

	Gender						Total (n=132)
	Male		Female		Transgender		
	Count	Count (%)	Count	Column N %	Count	Column N %	Count (%)
HIV 1	83	98.8%	46	100.0%	2	100.0%	131 (99.2)
HIV2	1	1.2%	0	0.0%	0	0.0%	1 (0.75)
AIDS	68	81.0%	30	65.2%	2	100.0%	100 (75.75)

Table 1: HIV 1, HIV2 and AIDS

	Gender						Total
	Male		Female		Transgender		
	Count	Column N %	Count	Column N %	Count	Column N %	Count (%)
Heterosexual	79	94.0%	45	97.8%	0	0.0%	124 (94)
Homosexual	0	0.0%	0	0.0%	2	100.0%	2 (1.5)
Vertical	2	2.4%	0	0.0%	0	0.0%	2 (1.5)
Unknown	3	3.6%	1	2.2%	0	0.0%	4 (3)
Total	84	100.0%	46	100.0%	2	100.0%	132 (100)

Table-2: Distribution of subjects based on Route of Transmission.

Marital Status	Gender						Total
	Male		Female		Transgender		
	Count	Column N %	Count	Column N %	Count	Column N %	Count (%)
Married	72	85.7%	26	56.5%	0	0.0%	98 (74.2)
Unmarried	5	6.0%	2	4.3%	2	100.0%	9 (7)
Divorced	6	7.1%	6	13.0%	0	0.0%	12 (9)
Widow/widower	1	1.2%	12	26.1%	0	0.0%	13 (9.8)
Total	84	100.0%	44	100.0%	2	100.0%	132 (100)

Table-3: Distribution of subjects based on Marital status

	Gender						Total (n=132)
	Male		Female		Transgender		
	Count	Column N %	Count	Column N %	Count	Column N %	Count (%)
Fever	40	47.6%	24	52.2%	0	0.0%	64 (48.48)
Emaciated built	55	65.5%	24	52.2%	1	50.0%	80 (60.6)
Tachypnoea	37	44.0%	19	41.3%	0	0.0%	56 (42.42)
Pallor	6	7.1%	11	23.9%	1	50.0%	18 (13.63)
Icterus	1	1.2%	3	6.5%	0	0.0%	4 (3.03)
Abdominal distension	12	14.3%	13	28.3%	0	0.0%	25 (18.93)
Oedema	15	17.9%	15	32.6%	0	0.0%	30 (22.72)
Lymphadenopathy	46	54.8%	21	45.7%	1	50.0%	68 (51.51)
Skin lesions	9	10.7%	5	10.9%	1	50.0%	15 (11.36)
Thrush	35	41.7%	22	47.8%	2	100.0%	59 (44.69)

Table-4: Distribution of study subjects based on clinical signs

	Gender						Total (n=132)
	Male		Female		Transgender		
	Count	Column N %	Count	Column N %	Count	Column N %	Count (%)
Bacterial	48	57.1%	26	56.5%	0	0.0%	74 (56.06)
Fungal	36	42.9%	22	47.8%	2	100.0%	60 (45.45)
Viral	11	13.1%	2	4.3%	1	50.0%	14 (10.6)
Parasitic	10	11.9%	1	2.2%	1	50.0%	12 (9.09)
Non-opportunistic illness	21	25.0%	18	39.1%	0	0.0%	39 (29.54)

Table-5: Distribution of study subjects based type of opportunistic infections and those without.

	Gender						Total (n=132)
	Male		Female		Transgender		
	Count	Column N %	Count	Column N %	Count	Column N %	Count (%)
Nervous system	26	31.0%	12	26.1%	0	0.0%	38 (28.8)
Respiratory system	31	36.9%	13	28.3%	0	0.0%	44 (33.3)
Cardiovascular system	5	6.0%	2	4.3%	0	0.0%	07 (5.3)
Reticuloendothelial system	1	1.2%	7	15.2%	0	0.0%	08 (6.1)
Gastrointestinal system	19	22.6%	10	21.7%	2	100.0%	31 (23.4)
Renal	2	2.4%	2	4.3%	0	0.0%	4 (3.1)
Total	84	100.0%	46	100.0%	2	100.0%	132 (100)

Table-6: Distribution of study subjects based on System involved

CMV retinitis, Mooloscum contagiosum, Progressive multifocal *leukoencephalopathy*, *Staphylococcus aureus* and *Entamoeba histolytica* were seen.

DISCUSSION

In the present study total 132 HIV positive patients were included. Out of these patients, 84 were males (63.63%), 46 were female (34.84%) and 2 were transgender males (1.49%). The majority of patients were in the age group of 28-37 years. This is consistent with other studies reported from India and abroad.^{3,4} It was observed that the frequency of OI was highest in the sexually active age group of society.

This indicates a trend of young and productive generation being affected a reflection of the devastating effects India will face as this work force is affected.

Out of the 132 in-patients taken 131 were HIV-1 positive while only 1 was HIV -2 positive. The incidence of OIs was significantly high in patients who were less educated and this directly indicates the impact of level of education on the transmission of the disease, as education is directly related to the level of awareness.⁵ The commonest mode of

transmission was heterosexual (94%) followed by others, as heterosexual transmission remains the commonest mode since other sexual practices being very uncommon in this part of the world.⁶ This study also found that a small proportion of transmission attributed to needle prick as observed in other studies.^{7,8}

In this study, it was found that Weight loss was the most frequently occurring symptom present in 90% of the cases followed by fever, shortness of breath and loss of appetite. These findings are consistent with studies reported in literature.^{9,10}

In this study total 160 opportunistic infections were found comprising of bacterial, fungal, parasitic and viral infections. Among different opportunistic infections, bacterial infections were seen in 56.06% (74) patients, followed by fungal in 45.45%(60), viral in 10.6%(12) and parasitic in 90.9%(12) respectively.

Numerous OIs occur in HIV infected patients due to down regulation of the immune system. In the present study, it was found that TB was the most frequent OI accounting for

41.5% of all infections followed by candidiasis in 31.1% of cases. Similarly in a study of Sharma¹¹ and Vajpayee,¹² TB was most common OI followed by candidiasis, whereas contradictory to this in a study of Patel,¹³ Giri¹⁴ and Singh¹⁵ candidiasis was the most common followed by TB.

Among bacterial infections, tuberculosis was found to be most common bacterial infection. It was seen in 41.5% of all the 132 patients out of which 49.2% were of pulmonary tuberculosis and 50.8% were of extrapulmonary tuberculosis. As far as tuberculosis is concerned we found almost equal distribution of pulmonary tuberculosis and extra-pulmonary tuberculosis in the study group with slightly more number of extra-pulmonary tuberculosis cases. Equal distribution of pulmonary tuberculosis and extra-pulmonary tuberculosis has also been observed by Ayyagari et al¹⁶ although in small number of cases. Our findings are nearly similar to findings reported by Sunderam G. et al¹⁷, Misra SN et al¹⁸

In the present study, *Klebsiella pneumoniae* was found to be most common pneumonia causing bacterial pathogen. Other organisms found to cause pneumonia in the present study were *Staphylococcus aureus* and *Streptococcus pneumoniae* which were also reported as common bacterial pathogens causing pneumonia.

Fungal infections were the second common infections (45.45%) in all the 160 patients after bacterial infections in the present study. Among all the fungal infections Candidiasis was found to be the most common fungal infection (87.87%) in present study group which is in accordance with the range (12-93%) as reported by Greenspan.¹⁹

The high incidence of Candidiasis in the present study can be explained by the fact that it is the second most common AIDS defining illness after tuberculosis in advanced stage of HIV infection in developing country like ours. Out of 58 cases of Candidiasis, disseminated Candidiasis was found in 6 patients 10.34% (6/58) which is in accordance with reports by other workers (Kumar S Satheesh et al²⁰ and Sanjeev Sinha et al²¹

In the present study second common fungal infection after Candida was found to be Cryptococcal meningitis (7.5%) among all fungal infections which is within the range (6-13%) reported by Murakawa et al.²² Third common fungal infection found in present study was *Pneumocystis jirovecii* pneumonia (4.54%) among all fungal infections which is in the range (0.7-7%) as reported by Kumarasamy et al²³ in a recent study.

Lower incidence found in present study as compared to above-mentioned reports may be due to difference in types of samples processed. In the present study, induced sputum samples were processed for demonstration of *Pneumocystis jirovecii* while other workers apart from processing sputum, have also used bronchoalveolar lavage, endo bronchial brushings or even lung biopsy. The disparity in the incidence of *Pneumocystis jirovecii* in present study from the others mentioned earlier may also be due to the fact that majority of the patients in present study group belonged to later stage of HIV infection at which chemoprophylaxis is already initiated as per NACO guidelines.

Among opportunistic infections, viral infections were seen in 10.1% of all 159 patients in this study. In this group of viral infections, Herpes virus infection especially zoster was found to be most common Herpes infection (53.3%). In the present study, Herpes zoster infections were seen in 5% of total 160 patients. However higher incidence (11.2-20%) has been reported by Sivayathorn A et al.²⁴

Of total 15 viral infections cases, 2 were found to be having genital herpes in present study (13.3%) which is in accordance with herpes genitalis in 7.7% patients as reported by Kumarasamy et al²⁵ and 10.9% by Sivayathorn A et al.²⁴ Kumarasamy et al²⁵ (2000) reported Molluscum contagiosum in 1.3% of patients. Findings in present study group are similar to those reported by Biswas Jyotirmay et al²⁶ and Kumarasamy et al.²⁵

We found only one case of Cytomegalovirus retinitis (6.6%) among all viral infections though high range (15-20%) has been reported by foreign workers Drew et al 1988.²⁷

In the present study were found to be parasitic infections i.e. 9.09% of all the 160 patients. The most common parasitic infestation observed was *Cryptosporidium parvum* (78.57%). Agarwal A et al²⁸ has reported *Cryptosporidium parvum* in 81.8% of patients while 56.5% incidence of *Cryptosporidium* has been documented by Javid Sadraei et al²⁹ which is in accordance with findings of present study.

Though the *Toxoplasma gondii* has been described as one of the most common opportunistic infection in AIDS patients, in the present study we found only one case of cerebral toxoplasmosis (2.8%) which is in accordance with findings reported by Ponniah P et al³⁰

CONCLUSION

It can be concluded from the results of this study that the major cause of admission of HIV patients still remains to be opportunistic infections. Human immunodeficiency virus-TB co infection is a serious problem worldwide but especially of concern in India where background rates of TB is highest in the world. In India, the most common OI among people with HIV infection is pulmonary TB. Hence respiratory system is most commonly involved as observed in our study.

The male gender is the important factors in HIV-AIDS infection. Candidiasis as opportunistic infection is the first indication of immunodeficiency followed by tuberculosis and *Cryptosporidium parvum* infection.

Early diagnosis and prompt treatment of opportunistic infections is important before development of severe immunodeficiency to prevent serious and fatal outcome

Ethical approval

The study was approved by the Institutional Ethics Committee

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 11-03-2019; **Accepted:** 16-04-2019; **Published:** 28-04-2019