

## Opportunistic infections and clinical profile of HIV/AIDS patients: A study from eastern region of Nepal

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### ABSTRACT

There is a wide spread availability of highly active antiretroviral treatment but opportunistic illnesses still occur and result in an increased risk of mortality among persons with HIV/AIDS. The spectrum of illness that one observes, changes as the CD4+ cell count declines. The close relationship between clinical manifestation and CD4+ cell count has made measurement of the latter a routine part of evaluation of the progress of HIV infection in individuals. The objective of this study was to reveal the clinical spectrum and explore the different types of opportunistic infections in HIV/AIDS patients. A total of 234 patients with HIV/AIDS from three ART centers of Eastern Nepal were purposively selected for this cross sectional study conducted from May 2009 to April 2010. Statistical analysis was done using SPSS version 11.5. Chi-squared test and Student's t test were applied to find the association between the variables. A p-value less than 0.05 was considered to be significant. Out of the 234 patient, 85% were found to be symptomatic. Most common presenting symptoms were weight loss (74.4%) followed by fever (59.4%). Around 64% of HIV/AIDS patients had a CD4+ cell count below 200 cells/mm<sup>3</sup>. Most common opportunistic infections were tuberculosis (51.1%) followed by oral candidiasis (21.7%). A significant relationship (p<0.001) between decrease in CD4+ cell count and occurrence of opportunistic infections in HIV/AIDS patients was seen.

**Keywords:** HIV/AIDS, Opportunistic infection, CD4+Tcell, Tuberculosis, Nepal

### INTRODUCTION

Since the beginning of the human immunodeficiency virus (HIV) epidemic, opportunistic infections have been recognized as common complications of HIV infection.<sup>1-3</sup> HIV is a slow acting retrovirus that typically takes years to produce illness in an infected person. Over several years of illness, an HIV positive person's immune system is gradually weakened due to reduction of CD4+Tcell in body and various pathogens take advantage of this weakened state to attack and cause illness of various kinds. These types of infections in HIV positive person are called "opportunistic infections". People with advanced human immunodeficiency virus (HIV) infection are vulnerable because they take advantage of the opportunity offered by a weakened immunosystem.<sup>1-2, 4</sup> so the aim of the study is reveal the clinical spectrum and explore the various type of OI in HIV/AIDS patients.

### MATERIALS AND METHODS

This is a cross sectional study with purposive sampling from May 2009 – April 2010. The study was undertaken in all three ART centers of eastern Nepal (BP Koirala institute of Health sciences Dharan, Koshi Zonal Hospital Biratnagar and Mechi

Zonal Hospital Bhadrapur). Out of 234 patients 20 patients were taken from Mechi zonal hospital, 70 patients were taken from Koshi Zonal hospital and 144 patients were taken from BPKIHS. Most of the patients were taken from BPKIHS because this is the only tertiary care hospital in eastern region where laboratory facility for CD4+T cell count and diagnosis of advance opportunistic infections is available. The statistical analysis was done by using software SPSS version 11.5. Chi-square test and t test was applied to find out the significant association among the variables. P value <0.05 was considered to be significant. Informed consent was obtained from the patients. Confidentiality of the patients was maintained. Ethical clearance was taken from the ethical committee of the institute

**Results** Among the 234 respondents almost 85 % were found symptomatic before diagnosis of disease. Most common complaint in both sexes were weight loss (74.4%) followed by fever (59.4%) (Table1).

HIV infection results in progressive loss of CD4+T cell from circulation as well as its depletion from body store. Table 2 shows that 64% of HIV/AIDS patients had CD4+T cell counts below 200 cell/ mm<sup>3</sup>.

**Table 1.** Common sign and symptoms of HIV/AIDS patients [n=234]

Symptoms	Sex				Total	
	Male		Female			
	[N]	[%]	[N]	[%]	[N]	[%]
Fever	104	62.7	35	51.5	139	59.4
Wt. loss	132	79.5	42	61.8	174	74.4
Diarrhea	53	31.9	23	33.8	76	32.5
Cough/SOB*	72	43.4	13	19.1	85	36.3
Oropharyngeal Ulcer	19	11.4	7	10.3	26	11.1
Headache	33	19.9	8	11.1	41	17.5
Malaise/asthenia	52	31.3	17	25.0	69	29.5
PGL*	4	2.4	2	2.9	6	2.6
Recurrent Herpeszoster infection	5	3.0	6	8.8	11	4.7
Total	166		68		234	

\*PGL- persistent generalized lymphadenopathy

\*SOB- shortness of breath

**Table 2.** CD4+T cell count of HIV/AIDS patients [n=234]

CD4+Tcellcount	No.	%	Mean±SD	Median [min-max]
0-49	22	9.4	202.10±152.90	173.50 (8-922)
50-99	28	12.0		
100-199	99	42.3		
>200	85	36.3		
Total	234	100.0		

Among 234 patients 170(73%) were suffering from opportunistic infections. The most common OI in HIV/AIDS patients were tuberculosis (51.1%) followed by oral candidiasis (21.7%), herpes zoster infection (15.8%), tinea infection (10.5%), and leishmaniasis (2.9%). Among tuberculosis pulmonary tuberculosis were 58.6% and rest 41.4% were extra pulmonary tuberculosis. Among the extra pulmonary tuberculosis most common were tuberculous pleural effusion followed by tubercular lymphadenitis, abdominal tuberculosis, tubercular meningitis and spinal tuberculosis respectively. There were various other infections found in the patients, i.e. cryptococcal meningitis, pneumocystis carinii pneumonia, scabies, giardiasis, toxoplasmosis, molluscum contagiosum, which were very less in numbers (Table 3).

Table 4 shows that, out of the 234 HIV/AIDS patients around 73% were found to have opportunistic infections. The mean CD4+Tcell count of the HIV/AIDS patients with opportunistic infections was 160 and that without opportunistic infections was 312. This shows significant relationship ( $P<0.001$ ) between decrease in CD4+T cell count and occurrence of opportunistic infections in HIV/AIDS patients.

**Table 3.** Opportunistic infections in HIV/AIDS patients [n=170]

Opportunistic infections	No.	%
Tuberculosis infection	87	51.2
Pulmonary Tuberculosis	51	58.6*
Extra Pulmonary Tuberculosis	36	41.4*
Oral candidiasis	37	21.7
Herpes zoster infection	27	15.8
Leishmaniasis infection	5	2.9
Cryptococcal meningitis(Lab confirmed)	4	2.4
Tinea infection	18	10.6
Toxoplasmosis	1	0.6
P. jirovecii pneumonia(Clinical diagnosis)	1	0.6
Scabies	3	1.8
Strongyloides	1	0.6
Giardiasis	2	1.1
isoporaella	1	0.5

Note: \* percentage was taken out of total Tuberculosis infection.

**Table 4.** Comparison of CD4+Tcell Count in HIV infected patients with or without Opportunistic Infection [n=234]

Status of opportunistic infection	No.	%	CD4+ (mean±SD)	p-value
With opportunistic infection	170	72.6	160±100	<0.001
Without opportunistic infection	64	27.4	312±205	
Total	234	100		

Most of the opportunistic infections were found in patients with CD4+T cell count below 200, which shows significant relation of opportunistic infections and immune compromise state of the patients ( $P<0.001$ ). There is inverse relationship between CD4+T cell count and occurrence of opportunistic infection i.e. lower the CD4+T cell count higher the percentage of patients of opportunistic infection. (Table 5)

**Table 5.** Association between CD4+Tcell count and opportunistic infection [n=170]

Variable	Opportunistic infections		p-value
	CD4+Tcell count	Yes[%]	
0-49	95.5	4.5	<0.001
50-99	85.7	14.3	
100-199	88.8	11.2	
>200	52.9	47.1	

## DISCUSSION

Most of the morbidity and mortality in AIDS cases result from opportunistic infections. Identification of such pathogens is very important for clinicians and health planners to tackle the AIDS epidemic in an effective manner.<sup>5</sup> In resource-limited settings, knowledge regarding the prevalence of various OIs might aid in making decisions regarding empirical treatment and would help to prioritize limited resources.

This study has shown that most common presenting symptoms were weight loss (74.4%) followed by fever (59.4%), cough/shortness of breath (36.3%), diarrhea (32.5%), malaise/asthenia (29.5%). Similar results were found in study done by Pandey S *et al* according to which weight loss (58.8%), fever (83.1%), cough (46.3%) and diarrhea (45%) were the most common.<sup>6</sup> In a study done by Zaheer M.S. *et al* in Aligarh, most common complaint was weight loss (77%), fever (68.8%) and cough (50%) among HIV patients.<sup>7</sup> Similarly in a study done by Das R N *et al*, fever was the commonest presenting symptoms (48.6%) followed by cough and dyspnoea (36.5%) and weight loss (36.5%).<sup>8</sup>

The mean CD4+Tcell count of the HIV/AIDS patients with opportunistic infections was  $160 \pm 100$  and that without opportunistic infections was  $312 \pm 205$  ( $P < 0.001$ ). These findings are supported by study done by Pandey S *et al* which shows mean CD4+Tcell count of patients with OI was  $152 \pm 103$  and without OI was  $248 \pm 182$  ( $p < 0.001$ ).<sup>6</sup> The study showed significant relationship between decrease in CD4+Tcell count and occurrence of OI in HIV/AIDS patients. A study done at Delhi also reported that mean CD4+Tcell continue HIV/AIDS patients was  $133 \pm 97$  cmm.<sup>9</sup> Similar results were also observed in a study done at Pune in which also mean CD4+Tcell count was  $133 \pm 100$  cmm.<sup>10</sup>

Study done in South Korea showed that 25% of the patients with CD4+Tcell count below 200 suffered from opportunistic infections.<sup>11</sup>

Similar type of study done at Aligarh by Zaheer M.S. *et al*<sup>7</sup> revealed that tuberculosis was the most common opportunistic infection (70.8%) followed by candidiasis (22.9%) these findings were comparable with this study.

A study done by Mir M.A. *et al*. showed that pulmonary tuberculosis and oropharyngeal candidiasis were commonest opportunistic infections similar with this study finding.<sup>12</sup>

Similarly a study done in Palpa, Nepal revealed that 40% HIV seropositive cases were reported to have tuberculosis out of which 75% had pulmonary tuberculosis and 25 percent had extra pulmonary

tuberculosis.<sup>13</sup> This may be due to endemicity of the causative agent. However determining the spectrum of OIs and their changing pattern over the years, in a given region requires adequate surveillance and good diagnostic services that are not available in many parts of the developing countries like Nepal.

Other major opportunistic infection in HIV positive patients in this study was oral candidiasis (22%). Candidiasis occurred frequently with HIV infection in a study done in South India as it was reported in 59% of AIDS cases.<sup>14</sup> Kumarasamy *et al* reported that candidiasis occurred in up to 70% of HIV infected cases.<sup>15</sup>

Our study showed that 2.4% of patients were found to be infected with cryptosporidial infection (laboratory confirmed cryptococcal meningitis) similar with the study done by Dhungana *et al* 2% of patients were diagnosed as meningitis due to cryptococcal sp.<sup>16</sup>

HIV co-infection with Cryptococcal infections has increased from 20% in 1992-1996 to 37% in 1996-2000 to 49% in 2000-2004 at All Indian Institute of Medical Sciences (AIMS).<sup>17</sup> Possible reason for increase in prevalence could be greater awareness of physicians about diseases and improvement in the diagnostic methods (such as, CT scan, magnetic resonance imaging, brain biopsy, PCR). But in our context, lack of resources, poor diagnostic facility and unavailability of trained personnel to diagnose infections may be the cause of such low prevalence of infections among patients.

In our study one of the HIV/AIDS patients was found co-infected with Pneumocystis jirovecii pneumonia (clinically diagnosed). This finding was comparable with the study by Dhungana *et al*.<sup>18</sup> In another study done in Nepal, 2 out of 54 HIV positive cases were found to have Pneumocystis jirovecii pneumonia.<sup>18</sup> It is now established that Pneumocystis jirovecii pneumonia is one of the common opportunistic infections in HIV but the cases are relatively less documented, may be due to the lack of routine testing facility.<sup>19</sup> Pneumocystis jirovecii pneumonia is rarely documented in India too.<sup>15</sup>

This study showed that 2.9% of patients were co-infected with visceral leishmaniasis which was also supported with finding published by Das R N *et al*. where two cases of visceraleishmaniasis with HIV infection were reported.<sup>8</sup> The co-infection of leishmaniasis is common in endemic region of the world which is gradually increasing. It is estimated that 500,000 new cases of Visceral leishmaniasis occur annually in which ninety percent of these cases are in five countries namely Bangladesh, Brazil, India, Nepal and Sudan (WHO) due to this leishmaniasis has joined the list of AIDS related opportunistic infections in endemic areas.<sup>20</sup>

Tuberculosis and oral candidiasis were most common opportunistic infections in HIV Patients. Significant relationship was found between CD4+T cell and OIs. Most of the OIs were found below 200 CD4+T cell counts which also explain the relation between immune compromise status of patients and opportunistic infections.

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