

## Clinical features of HIV/AIDS and various opportunistic infections in relation to antiretroviral status among HIV seropositive individuals from Central Nepal

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### Abstract

**Background:** So far, antiretroviral therapy is the only effective treatment available to HIV/AIDS patients. Provision of combined package of treatment, care and support service as well as regular assessment of the therapy increases its effectiveness.

**Objective:** The aim of this study was to establish the relationship between antiretroviral therapy status and clinical features/opportunistic infections among HIV seropositive individuals.

**Materials and methods:** This is a cross-sectional study. Study was carried out between October 2007 and May 2008 in 150 HIV patients of Kathmandu, Central Nepal. After taking informed consent pre-structured questionnaire was filled to assess clinical features and specimen were collected to investigate major OIs as per standard microbiological procedure. All the information were entered into SPSS 11.5 system and analysed.

**Result:** Of the 150 patients, 100 (66.7%) were males and 50 (33.3%) were females. The age group 21-30 years was predominant followed by 31-40 years (42%). Significant relationship could be established between intake of ART and cardinal symptoms of HIV/AIDS ( $\chi^2$  value ranging from 4.11 to 9.34). However, no significant relationship could be established between the intake of ART and distribution of different OIs ( $\chi^2$  values ranging from 0.15 to 1.6).

**Conclusion:** Antiretroviral therapy was found to effective enough to reduce the clinical features of AIDS. Diagnosis and treatment of opportunistic infections should be routinely done for both groups of patients.

**Key words:** Antiretroviral therapy, CD4 count, HIV/AIDS, Nepal

The spectrum of complications emerging in successfully treated HIV-infected patients has dramatically changed since the advent of highly active antiretroviral therapy (HAART)<sup>1</sup>. Due to the advent in molecular research aimed at AIDS chemotherapy, scientists have succeeded in developing the chemotherapies sufficient enough to halting or at least slowing the progression of HIV infection to AIDS by the use of life prolonging anti HIV/AIDS regimens termed as Antiretroviral drugs and this method of treatment of HIV is known as anti retroviral therapy (ART)<sup>2</sup>. The basic principle of ART is that a set of combination of prescribed drugs blocks the replication of virus and hence there is less chance of increasing the viral load in the body resulting the replenishment of CD4 cells there by prolonging the life of the patients<sup>3</sup>.

From the very beginning of diagnosis of HIV/AIDS in 1981, many opportunistic infections and HIV related conditions have been described. Among the major clinical manifestation of AIDS, fever, weight loss and

diarrhoea are considered important for the surveillance purpose in high prevalence countries<sup>4</sup>. Opportunistic infections (OIs) of varying types and severities have been reported amongst HIV infected patients around the world<sup>5</sup>. So, it is essential to define the incidence, spectrum and effects of OIs on HIV infected persons for the effective delivery of treatment care and support services.

In 2007, the total number of people living with HIV/AIDS (PLHA) in the world was 33 millions (30 – 36 millions)<sup>6</sup>. Nepal is facing rapid increase in HIV prevalence among high risk groups such as sex workers, injecting drug users (IDUs), and migrants and their housewives. The recorded number of PLHA in Nepal as reported by National centre of AIDS and

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STI control (NCASC) is 14,320 (as of July 2009)<sup>7</sup>. So far in Nepal, although some studies have been done in opportunistic infections in HIV/AIDS, very few studies have been done in small sample size to establish its relationship with ART<sup>4,8,9</sup>. So, this cross-sectional study has been carried out in a representative sample of HIV/AIDS patients visiting a tertiary care hospital with well facilitated ART clinic, and other HIV care centre of central Nepal with patient coverage throughout the country so that the inference drawn may represent the national scenario.

### Materials and methods

This study was carried out in Tribhuvan University Teaching Hospital (TUTH) during January October 2007 to May 2008. Altogether 150 PLHA (both symptomatic and asymptomatic) were included in the study. They were selected from TUTH VCT, Maharajgunj; Navakiran Plus HIV/AIDS Care home Budhanilakantha; Sparsha Nepal HIV/AIDS care home, Sanepa; and Crisis Centre, Lalitpur. Patient selection was done by random sampling method using the patients' lists available in the respective sites.

After taking informed consent, they were interviewed to fill up the pre-structured questionnaire. Then, specimens were collected which included sputum (three sputa specimen – first spot, early morning, second spot), stool and oral swab. All the three sputa were used to make separate smear and stained by Ziehl Neelson method, early morning sputum was inoculated into a blood agar (for culturing pneumococci) and finally it was processed by modified Petroff's method prior to inoculation into two sets of Lowenstein Jenson media. If the suspected colonies were obtained in the respective culture media they were further confirmed by the biochemical test as per standard microbiological laboratory procedure. Similarly, a part of stool specimen was used to make wet mount preparation, another part was processed and stained by modified Ziehl Nelson staining technique (for the detection of *Cryptosporidium parvum*) and

remaining part was used to inoculate into Xylulose lysine deoxycholate agar plate for the isolation of *Salmonella* spp. If the colonies were obtained in the culture plates were also confirmed by standard biochemical tests for identifying enteric bacteria. For the diagnosis of candidiasis, oral swab specimen was cultured in potato dextrose agar and if the desired colonies were obtained they were further confirmed by wet mount preparation as well as germ tube culture as per standard microbiological procedure. All the information were entered into SPSS 11.5 and analyzed.

### Result

Among 150 People living with HIV/AIDS (PLHA) volunteers, 100 (66.7%) were males and 50 (33.3%) were females. The age group 21-30 years was predominant (42.7%) followed by 31-40 (42.0%). The mean age was found to be 26.2 with standard deviation 9.3. Most of them were illiterate (41.3 %), married (49.3%), Farmer (35.3%) and acquired HIV infection through sexual means which was as high as 98% in females. In contrast to the females, the males exhibited the equal chance of acquiring HIV infection by sexual as well as sharing injection as shown in Table 1. Only 45.3% of the HIV patients were taking ART. Higher percentage of females was taking ART in comparison to the males as shown in Table 2. Significant relationship could be established between intake of ART and major symptoms of HIV/AIDS ( $\chi^2$  value ranging from 4.11 to 9.34) as shown in table 3. However, no significant relationship could be established between the intake of ART and distribution of different OIs as indicated by the insignificant  $\chi^2$  values ranging from 0.15 to 1.6 as shown in table 4. Among the 150 HIV patients, 28 have done multiple CD4 count (before and after ART initiation). ART was found to be effective enough to increase the CD4 count of as high as 96.4 % of the ART recipient as shown in table 5. Among 150 HIV patients, 40 have recorded multiple weight (before and after ART initiation). On the basis of the report, seventy five percent of them have gained weight after taking ART as shown in table 6.

**Table 1: Socio-demographic characteristics of studied subjects by gender**

Characteristics	Male No. (%)	Female No. (%)	Total No. (%)
<b>Age group (Yrs)</b>			
1-10	1(1.0)	0 (0)	1(0.7)
11-20	3 (3.0)	0 (0)	3(2.0)
21-30	39(39.0)	25 (50)	64(42.7)
31-40	43(43.0)	20 (40)	63(42.0)
41-50	14(14.0)	4(8)	18(12.0)
51-60	0 (0)	1(2)	1(0.7)
<b>Total</b>	<b>100(100)</b>	<b>50 (100)</b>	<b>150 (100)</b>
<b>Marital status</b>			
Married	56(56.0)	18 (36.0)	74 (49.3)
Unmarried	31 (31.0)	2(4.0)	33 (22.0)
Widow	9(9.0)	30 (60.0)	39 (26.0)
Divorced	4 (4.0)	0(0)	4 (2.7)
Total	100(100.0)	50 (100.0)	150 (100.00)
<b>Education</b>			
Illiterate	31(31.0)	31 (62.00)	62 (41.3)
Primary	44(44.0)	10(20.0)	54(36.1)
Lower Sec.	2(2.0)	0(0)	2 (1.3)
Secondary	22(22.0)	8(16.0%)	30(20.0)
Higher Sec.	1 (1.0)	1(2.0%)	2 (1.3)
<b>Total</b>	<b>1 (1.0)</b>	<b>1(2.0%)</b>	<b>2 (1.3)</b>
<b>Occupation</b>			
Unemployed	28(28.0)	15 (30.0)	43 (28.7)
Farmer	30 (30.0)	23 (46.0)	53 (35.3)
NGO/INGO	16 (16.0)	6 (12.0)	22 (14.7)
Teacher	0(0)	1 (2.0)	1(0.7)
Volunteer	13 (13.0)	3 (6.0)	16 (10.7)
Business	8 (8.0)	2 (4.00)	10 (6.7)
Driver	2 (2.0)	0(0)	2(1.3)
Foreign job	1 (1.0)	0 (0)	1 (0.7)
Student	2 (2.0)	0(0)	2(1.3)
<b>Total</b>	<b>100 (100.0)</b>	<b>50 (100.0)</b>	<b>150(100.0)</b>
<b>HIV transmission</b>			
Sexual	49 (49.0)	49 (98.0)	98 (65.3)
IDU	49 (49.0)	1 (2.0)	50 (33.3)
Mother to child	2 (2.0)	0(0)	2 (1.3)
<b>Total</b>	<b>100 (100.0)</b>	<b>50 (100.0)</b>	<b>150(100.0)</b>

**Table 2: Distribution of HIV patients by ART status**

	Sex of the patients		
	Male Number (%)	Female Number (%)	Total Number (%)
Yes	42 (42.0)	26 (52.0)	68 (45.3)
No	58 (58.0)	24 (48.0)	82 (54.7)
<b>Total</b>	<b>100 (100.0)</b>	<b>50 (100.0)</b>	<b>150 (100.0)</b>

**Table 3:** Distribution of major symptoms of HIV/AIDS by ART status

Clinical features		ARV status		X <sup>2</sup> , 1 df
		Yes	No	
Diarrhoea	Yes	1	15	9.34 P<0.05
	No	67	67	
Continuous fever	Yes	9	25	6.31 P<0.05
	No	59	57	
Weight loss	Yes	8	26	8.43 P<0.05
	No	60	56	
Loss of appetite	Yes	11	28	6.23 P<0.05
	No	57	54	
Headache	Yes	4	15	4.11 P<0.05
	No	64	67	

**Table 4:** Distribution of OIs by antiretroviral therapy status of the patients

Opportunistic infections		ARV status		X <sup>2</sup> , 1 df
		Yes	No	
Oral Candidiasis	Yes	24	24	0.62 p>0.05
	No	44	58	
Pneumonia	Yes	16	27	1.6 p>0.05
	No	52	55	
Salmonella infection	Yes	15	16	0.15 p>0.05
	No	53	66	
Cryptosporidium infection	Yes	11	18	0.79 p>0.05
	No	57	64	
Tuberculosis	Yes	8	7	0.43 p>0.05
	No	60	25	

**Table 5:** Effect of ART on CD4

CD4 after ART	Number	Percent
Increase in CD4 after ART	27	96.4
No increase in CD4 after ART	1	3.6
<b>Total</b>	<b>28</b>	<b>100</b>

**Table 6:** Effect of ART on weight of the patients

Weight after ART	Number	Percent
Increase in weight after ART	30	75
No increase in weight after ART	10	25
<b>Total</b>	<b>40</b>	<b>100</b>

## Discussion

One of the most important findings of this study is its revelation that ART is effective enough to reduce the HIV/AIDS related symptoms like fever, weight loss, diarrhoea, loss of appetite and headache (Table 3), thereby, supporting efficacy of the therapy. Similar results were obtained by a previous study in Seti Zonal hospital concluding that ART is effective enough in slowing the progression of HIV infection to AIDS<sup>9</sup>. Our study also demonstrates that there is no significant relationship between the antiretroviral therapy and prevalence of OIs. This might be due to the fact that almost all patients had CD4 count below 200 before initiation of ART and hence the chance of being attacked by different OIs increased accordingly. High prevalence of OIs such as pneumonia (52.8%), oral thrush (33.9%) and esophageal candidiasis (24.5%) were obtained in ART undergoing patients of Seti Zonal Hospital. Similarly, a study conducted in Italy concluded that candidiasis was severe challenge to patients undergoing HAART<sup>10</sup>. On the basis of study it can be advocated for the availability of ART services to needy individuals as 96.4% of the patients undertaking ART recorded increase in CD4 count and 75 % of the patients undertaking ART recorded increase in weight. One of the similar studies of China demonstrated that consistent adherence of ART had presented a higher CD4 cell count ( $p = 0.028$ )<sup>11</sup>. Another similar study of Zambia concluded that weight gain after ART initiation is associated with improved survival and decreased risk for clinical failure<sup>12</sup>.

In this study, as the samples were collected from PLHA volunteers seeking health care services through hospitals, care homes, and ART clinic, the inference drawn on the basis of this research cannot be generalised for general PLHA population of the community.

## Conclusion

Patients undertaking ART were less likely to manifest clinical features of AIDS in comparison to non-ART counterparts. However, both groups of patients are equally susceptible to OIs. It can be recommended that routine diagnosis and treatment of OIs is equally important for group of patients.

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