PREVALENCE OF INTESTINAL PARASITES IN HIV PATIENTS

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CERTIFICATE

This is to certify that this dissertation entitled "**PREVALENCE OF INTESTINAL PARASITES IN HIV PATIENTS**" submitted by **Dr.SHANKAR** to the TamilNadu Dr. M.G.R.Medical University, Chennai in partial fulfillment of the requirement for the award of M.D. degree Branch I (General Medicine) is a bonafide research work carried out by him under our direct supervision and guidance.

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DECLARATION

I, **Dr.P.SHANKAR**, declare that I carried out this work on, "**PREVALENCE OF INTESTINAL PARASITES IN HIV PATIENTS**" at Department of General Medicine, Government Rajaji Hospital during the period of January 2005 – February 2006. I also declare that this bonafide work or a part of this work was not submitted by me or any others for any award, degree, diploma to any University, board either in India or abroad.

This is submitted to the **TamilNadu Dr.M.G.R. Medical University**, Chennai, in partial fulfillment of the rules and regulations for the **M.D. degree** examination in General Medicine.

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CONTENTS

ABBREVIATIONS

WHO	-	World Health Organization
HIV	-	Human Immuno Deficiency Virus
AIDS	-	Acquired Immuno Deficiency Syndrome
LAV	-	Lumpadenopathy Associated Virus
HTLV III	-	Human T cell Lympotropnic Virus – III
ELISA	-	Enzyme Linked Immunosorbent Assay
ART	-	Anti Retroviral Therapy
CD number	-	Cluster of Differentiation number
AFS	-	Acid Fast Staining
ICMR	-	Indian Council of Medical Research

INTRODUCTION

HIV has evolved form a mysterious illness to global pandemic which has infected tens of million in 20 years.

By December 2003, 40 million people were living with HIV /AIDS. According to UNAIDS, WHO, (2003)[1], people newly infected with HIV were about 5 million in 2003, and about 3 million AIDS death in 2003. In SEAR countries according to WHO, reported HIV infection around 46.5 million and AIDS can as around 2.67 as May 2003[2].

The HIV epidemic in India in the early ascending phase with the total of 5 million HIV cases[3]. In India the first HIV seropositive case was identified in Madras and the first AIDS case in 1986[3].

According to NACO, 2004 the cumulative number of AIDS case in India has risen to 86028 no August 31st 2004. Another 7799 new cases of AIDS were detected in the month of August 2004.

Overall prevalence is around 0.7% in India. Tamilnadu has the prevalence of 1.35 to 1.50% and Maharastra has the prevalence of 1.50 to 1.75. By mid 2003, Tamilnadu had nearly half the reported AIDS cases (about 47%)

Mumbai and rest of Maharastra now share about 21% of reported cases of AIDS[4].

According to AIDS sentinel surveillance 2003, males account for 73.5% case of AIDS cases and females 26.5%. Since majority of HIV infections (27.7%) are in the age group of 15-44 years out of which 35% in the age group of 15-24 years, which implies it carries a greater social burden to the country.

In HIV infected patient progressive decline in their immunological response makes them extremely susceptible to various opportunistic infection and is the presenting symptom in approximately a third of HIV positive patient[3].

Opportunistic infections pose threat to life of AIDS patient. Proper detection and management with the antiretroviral therapy changes the HIV once dreadful disease to chronic manageable disease.

Of the number of cases detected for opportunistic infection during 2003, Tuberculosis around 3572 cases, PCP around 2130 cases, Herpes around 431 and cryptosporidiosis around 130, toxoplasmosis around 75 and the rest others. Intestinal parasites emerge as one of the important opportunistic infection. But

there exists significant geographical variation in the prevalence of intestinal parasitic infection in HIV patient.

Diarrhoea is a common complication of HIV positive patient. It occurs in almost 90% of AIDS patients in developing countries.

According to AIDS surveillance case definition, Center for Disease Control, Atlanta, Chronic intestinal cryptosporidiosis > 1 month duration and chronic intestinal isosporidiosis, > 1 month duration, were included in category C, so it is imperative that detection and treatment of diarrhea may increase the quality of life with HIV infection[5]. Chronic diarrhea is found to be an independent predictor of morality in AIDS[6,7].

AIM OF THE STUDY

1. To study the prevalence of intestinal parasites in HIV patients with and without Diarrhoea.

2. To study the correlation between CD4 counts and the intestinal parasites.

REVIEW OF LITERATURE

History

The first indication of new syndrome came in 1981, with reports form USA of a sudden unexplained outbreak of two rare disease Kaposi sarcoma and Pnemocystic jerovici in young adults who were homosexual and addicted to narcotics. The conditions was given the name acquired immune deficiency syndrome.

In 1983, Luc Mantagnier and Colleague from Pasteur institute Paris isolated the virus and called in LAV. In 1984 Robert Gallo from National Institute of Health, USA named HTLV III.

In 1985, Elisa available for defection of anti HIV anti bodies. In 1986 international committee on virus nomenclature decided on the generic name of human immuno deficiency virus (HIV).

Epidemiological Features:

India is epidemic is marked by heterogenicity, not by single epidemic but made up of number of distinct epidemis in some places in some state. In India epidemic seems to be following type 4 pattern, that epidemic spread form highest risk group (commercial sex workers, homosexual men, drug users) to bridge population client of sex workers, migrant population and then to general

population. This shift usually occurs where prevalence of first group reaches 5%.

Based on sentinel serveilliance data, HIV prevalence classified as

Table No.1 : Prevalence status

Group	Prevalence	High Risk Group	Antenatal mother
I	High	> 5%	> 1%
II	Moderate	> 5%	> 1%
III	Low	< 5%	< 1%

I Group: States like Maharastra, Tamilnadu, Karnataka, Andrapradesh, Manipur, Nagaland.

II Group: States Goa, Pondicherry,

III Group: Other states.

Agent Factors:

HIV belongs to the lentivirus subgroup of the family retroviridae, which is a spherical enveloped virus about 90-120 nm in size. The nucleocapid has an outer icosahedral shell and inner cone shaped core enclosing ribonucleoproteins outer shell enclosing two glycoprotein gp 120, the external glycoprotein and gp 41, the trans in membrane glycoproteins.

Host Factor:

Age: Most case occurs among the sexually active persons. In India 87.7% are in age group of 15.44 years, out of which 35% in the age group of 15-24 years.

Sex: In India males have higher proportion, but in Africa the sex ratio is equal.

High Risk groups:

Male homosexual and bisexuals, heterosexual parters, (including prostitues, intravenous drug abusers, transfusion of blood and blood products.

Domicile:

The trend of transmission shows infection spreading from urban to rural areas.

Replication Cycle of HIV

Attachment and entry:

GP 120 which after binds to N terminus of the receptors CC_R5 and CXCR4, on the host cell surface CD4 molecule. GP 120 undergoes (molecule) configurational changes which makes easy way for the penatraions of GP 41.

Reverse transcription and integration

Binding to CD4 molecule, virus is uncoated and the viral RNA is transcribed by enzyme reverse transcriptase into first single stranded DNA then to double stranded DNA which is integrated into host cell chromosome.

Transcription, Translation and Replication:

The integrated DNA is transcribed into messenger RNA (MRNA) which comes out to cytoplasm and viral proteins are synthesized using protein synthesing machinery and raw material from the host cell.

Maturation and release:

Newly synthesized progeny RNA and proteins are packaged together and released from the infected cell by “budding”.

Pattern of Transmission:

It is summarized in the following table.

Table 2: Exposure and Transmission Rate

Types of Exposure	Percentage Global Total	In India 2004
Sexual Vaginal Anal	 70-80% 5-10%	 85-72%
Perinatal	5-10%	3.14%
Injection Drug use	5-10%	2.95%
Blood transfusion	3-5%	2.17%
Others not specific	1-2%	6.02%

Estimates per contact risk of HIV infection is summarized in the following table.

Table 3: Actual risk per contact.

Activity	Risk
Needle Sharing	6/1000 to 30/1000
Occupational Needle Stick	1/300
Receptive Anal Sex	8/1000 to 30/1000
Receptive Vaginal Sex	3/10000 to 10/10000
Receptive Oral Sex:	Unknown

* Source: www. Cambridge.org. Adapted from table 1-2, Libman H, Makadon HJ, HIV therapy series, American college of physician, Philadelphia 2003.

Approximate chance of infection per exposure to blood and blood products is >90% and mother to baby transmission is around 30%.

Molecule Epidemiology of HIV:

According to sequence analysis gag and env genes, HIV 1 is classified into 10 subtypes from A to J which constitutes group ‘m’ (major) group ‘o’ (outlier) which constitutes heterogenous group and group N (new) is isolated from comeroon. Of the subtype in India, A and C is the most prevalent, worldwide subtype A is the most prevalent, B is more common is Africa and Europe.

Atleast 5 types of HIV-2, which is prevalent in Africa and India. HIV -2 has only 40% genetic homology with HIV-1.

Molecular Genetics

HIV contains gene which code for structural, non structural and regulatory proteins. Of the genes ‘*gag*’ genes determines core and shell, ‘*env*’ gene determines the synthesis of gp 160 which cleaves into two glycoproteins, gp 120 and gp 41. ‘*pol*’ gene determines the polymerase protein of the non structural gene ‘*vpu*’ present only in HIV-1 and ‘*vpx*’ gene present only in HIV-2.

Progression of Illness:

Average period to develop AIDS is 8-10 years. 5-10% of infected people progress to AIDS with in 2-3 years, they are called rapid progressors.

About 5% of infected people do not progress to AIDS even after 10 years are called long term non progressors. The reasons are

1. Mutant nef gene of HIV
2. Defective CCR5 cobinding protein on the macrophage due to genetic abnormality in the patient (10)

CLASSIFICATION

Revised classification system for HIV infection and expanded AIDS surveillance case definition for adolescents and adults (CDC – Atlanta) -1993.

Table 4: Classification of HIV

	CLINICAL CATEGORIES		
	A	**B**	**C**
CD4+ Cell count (per milcrolitre)conditions	Asymptomatic, acute primary infection or PGL	Symptomatic but not A or C conditions	AIDS indicator
> 500	A1	B1	C1
200 - 499	A2	B2	C2
< 200	A3	B3	C3

HIV infected persons classified in A3, B3, C1, C2, c3 are AIDS cases.

1993 AIDS surveillance case definition CDC Atlanta:

One or more of the following conditions in an adolescent (>13 years of age) or adults

Asymptomatic HIV infection

1. PGL
2. Acute (Primary) HIV infection with accompanying illness or history of acute HIV infection.

Category B:

Symptomatic conditions in a HIV infected adolescent or adult that are not included in clinical categorty ‘C’ and that meet atleast one of the following criteria. A)The conditions are attributed to HIV infection or are indicative of a defect in CMI. B) The conditions are considered by physician to have a clinical course or to require management that is complicated by HIV infection.

1. Bacillary angiomatosis
2. Bulvo vaginal candidiasis (Persistent, frequent or poorly responsive), oral candidiasis
3. Cervical dysplasia, cervical carcinoma in sity
4. Constitutional symptoms lasting more than one month
5. Oral hairy leukoplkia
6. Herpes zoster involving atleast 2 distinct episodes ormore than one dermatome
7. Idiopathic thrombocytopenic purpura
8. Listeriosis
9. Pelvic inflammatory disease
10. Peripheral neuropathy

Category C:

AIDS Indicator conditions

1. Candidiasis of the bronchi, trachea or lungs
2. Oesophageal candidiasis
3. Cervical cancer – invasive
4. Coccidioidomycosis
5. Cryptococcosis – extra pulmonary
6. Cryptosporidiosis – Chronic intestinal (>one month duration)
7. Cytomegalovirus disease (other than lung, spleen and nodes)
8. Cytomegalovirus Retinitis (with loss of vision)
9. HIV related encephalopathy
10. Herpes simplex – chronic ulcer, bronchitis, pneumonia or oesophagitis
11. Histoplasmosis – disseminated or extra pulmonary
12. Isosporiasis – chronic intestinal (>one month duration)
13. Kaposi's sarcoma
14. Burkitt's lymphoma
15. Immunoblastic lymphoma
16. Primary brain lymphoma
17. Mycobacterium Avium Intracellulare Complex, M.kanasasii infection – disseminated or extra pulmonary.
18. M.tuberculosis – any site

19. Mycobacterium other species or unidentified species – disseminated or extrapulmonary
20. Pneumocytis carinii pneumonia
21. Recurrent pneumonia
22. Progressive pneumonia
23. Progressive multifocal leukoencephalopathy
24. Salmonella septicaemia – recurrent
25. Toxoplasmosis of brain
26. Wasting syndrome

Intestinal Parasitosis in HIV Patinets

Broadly classified as

1. Protozoa	1. Cryptosporidium. Parvum	
	2. Isospora belli, Hominis	
	3. Entamoeba Histrolyrica	
	4. Entamoeba coli	
	5. Giardiasis	
Cestodes :	1. H. nana	
2. Namatode	:	1. Ascaris lumbricoids
		2. Ankylostoma deodenable
		3. Trichuris Trichuria
3. Trematodes	:	No significant percentage seen.

Cryptosporidiosis in HIV patients

Incidence :-

Incidence of Cryptosporidiosis in HIV patients with diarrhoea varies geographically from 10 to 20% in united state and western Europe to as high as 50% in developing countries[9].

Agent Factor:-

Cryptosporidiosis parvum occyst appeared as pinkish or orange spherical bodies measuring 4-6μm.

Transmission:-

Although most case occurred in immuno deficient patient, it also cause self limited gastroenteritis most of transmission attributed to contamination in water supplies[10, 11], swimming pools[12] and even in hospital ice machines[13].

Clinical Manifestations:-

Although cryprosporidosis can be acquired any time during the course HIV infection[14], major morbidity and mortality occur almost exclusively in patients with CD4 counts below 180cells/ mm^3, above this level spontaneous recovery generally occurs[10]. Patient with CD4 counts <50 cells/mm^3 usually results in progressive diarrhoea. Cryptosporidiosis mainly leads to chronic malabsoption of fluids, nutrients, Vitamins and electrolytes which results in

wasting and hypokalemic metabolic acidosis[15]. In patient who fail to respond to therapy, death usually occur in 3 to 6 months[16].

The most common clinical manifestation of cryptosporidiosis is an acute onset, non bloody diarrhoea without fever. Temperature higher than 39▫C is not characteristic of cryptosporidiosis and warrents investigation of other infection. Patient with AIDS have voluminous diarrhoea even upto 17 litre/day. Gastric involvement may present as nausea and vomiting without diarrhoea[17].

Pathophysiology

Cryptosporodiasis clinically present as

1. Transient (28.7%)
2. Chronic (59.7%)
3. Fulminant (17.8%)
4. Asymptomanc (3.9%)

Fulminant cryptosporidiosis means passage of more than 21 stools / day.

Pathogenesis

In HIV infected individuals lack of cell mediated immunity leads to heavy infestations of cryptosporidia oocysts on the intestinal mucosa, and these infestations correlate with an intense inflammatory response and impaired

absorptive function[18, 19]. The mean infective dose is 132 oocysts in non immune persons.

Preventive medicine:

After the 4 lakh cases of cryptosporidiosis in Milwakee, Wilconsin in 1993, resulted in atleast 100 death in patient with AIDS. Mortality is 73% in CD4 counts less than 50 cells/mm^3 and 86% when baseline count was between 50 to 200 cells/mm^3, it is clear that HIV patients are at risk.

Chlorination is not effective in preventing cryptosporidiosis but ozonation may be effective[23].

Centre for disease control, Atlanta made these Recommendations in prevention of cryprosporidiosis in HIV patients[23, 24].

1. HIV patient should not drink water directly from lakes and ponds.
2. They should avoid ingesting even small amounts of swimming pool water
3. Person with cryptosporidium should not use swimming pools.
4. Boiling tap water or filtering it through one micron filter or by using bottled filtered water will decrease the exposure.

5. Because substantial variation in purity exists among bottled water, water that comes from underground springs or that has filtered through NSF standard #53 filter will remove the oocystes.

Isospora belli :

Oocysts appears as oval bodies with immature or mature sporocyst measuring 20-40mm. Higher rates of isosporodiasis reported from Brazil in AIDS patient. The lower prevalence of isosporodiasis is ascribed to secondary prophylaxis for pnemocystosis through administration of sulfamethoxazole – trimethoprim during the course of infection, since is isopora belli is sensitive to this treatment. In HIV patient, isospora belli present with Loose motion, fever, intestinal colic, abdominal pain, loss of weight and Biliary colic.

E.HISTIOLYTICA:

Intestinal infection quite common among homosexuals studies in north America and Europe showed 20-30% of homosexual were positive for E. Histiolytica in their stool specimens. In Brazil the prevalence of amoebic infection in HIV is 5.8%. Presence of trophozoites in fresh stool is pathognomic. Clinical presentation of the patients were similar to that reported in non HIV patients.

HIV and Other Helminths:

The more common pathogenic helminth associated with AIDS is strongyloides stercoralis. Other helminth reported were Ascaris lumbricoides (3-5.2%), Trichuris Trichuria 4.14%, Ankylostoma deodenale (2.69%) Schistosoma mansoni (1.66%), H.nana (10.41%)

Co infection of HIV and round worms is particularly important. Adult round worms resides in the small intestine, but larvae migrate through tissues. Ascaris polarizes the immune response in young adults to Th_2, which increases the risk of sexual transmission of HIV.

Ascaris also suppress interleukin 2, a Th 1 cytokine that can be use for AIDS/HIV because it improves count of CD4 + T cells and restores immune function substantially

HIV and Giardiasis:

Giardia lamblia, infection is very commonly found in HIV patients with increased viral load. Though the same occur in Immuno competent person, in presence of HIV, they can cause severe prolong refractory diarrhoea.

HIV and other Parasites

Microsporidiasis are present with chronic diarrhoea and with billary manifestation with HIV and in infected individuals with CD4 counts between 50-100/mm^3.

Cyclospora, Blastocystis hominis are also reported in HIV patients with diarrhoea.

Role of ART

It is found that treatment with ART can clear cryptosporodiasis from an individual by reconstitution of immune system (WWW.Stanford.edu.) Other drugs like Paramomycin, Azithromycin found to be moderately effective against cryptospordiasis Nitazoxinide is effective in those who were not respond to the above drugs.

MATERIALS AND METHODS

Setting:

The study was conducted in both in patients and outpatients of Govt Rajaji Hospital.

Collaborating Departments:

1. ICMR / Out Patients
2. ART / Out Patients
3. Department of Medicine / In Patients
4. Institute of Microbiology, MMC, Madurai.

Design of study: Prospective analytical study

Study period: A period of 13 months from Jan 2005 to Feb 2005.

Sample Size:

120 patients with AIDS were included in the study. 40 patients of non diarrhoeal healthy HIV negative family members were included as control. Among the 80 patients with diarrhoea, patients were grouped based on clinical profile diarrhoea, as those with diarrhoea less than 2 weeks and those with more than 2 weeks.

Ethical Clearance: Obtained

Consent:

An informed consent were obtained from each patient.

Definition:

Diarrhoea is defined as passage of abnormal liquid or unformed stools in increased frequency. Diarrhoea may be further defined as acute if less than 2 weeks, persistant if 2 to 4 weeks and chronic if greater than 4 weeks. In our study diarrhoreal groups were classified as those who were presented with diarrhoea less than 2 weeks and those with greater than 2 weeks.

Selection criteria's

Inclusion Criteria

1. All men and women who were positive for HIV by Elisa who presented with and without diarrhoea were included in the study.
2. Of the 120 total patients more than 15 years of age group of patients were selected.

EXCLUSION CRITERIA

Patients who were excluded from the study like

1. Endocrine disorders
2. Malignancy
3. Collagen vascular disorders
4. Other organ disorders.

5. Patients on steroids therapy
6. Pregnancy
7. Tobacco and alcohol user.
8. Protein losing enteropathy
9. Crohn's disease
10. Irritable bowel syndrome
11. Unconscious / Bed ridden
12. Non co-operative non-willing
13. who were on antidiarrhoeal or on antimotility drugs
14. Patient using liquid paraffin / laxatives
15. Patient subjected to barium or Bismuth salts during the last one week
16. Tuberculosis
17. Renal disorders
18. Cholestasis

Materials:

Data Collection

Socio demography / clinical data were collected. They were subjected to HIV testing after proper counseling at voluntary confidential counseling and testing centre of this hospital. Blood samples were collected for Elisa for HIV-1 and HIV-2 using Innotest TM HIV-1/HIV-2 Sp innogenetics, N.V. Belgium , and lab systems HIV EIAKIT Finland, Elisa was done using the above two different kits.

Patients were explained about the proposed study and asked to collect stool samples.

Stools were subjected to the following methods for evaluation of parasites.

1. Wet saline method
2. Wet Iodine method
3. Floatation technique
4. Sedimentation technique
5. Modified Acid fast technique.

Collection of stool:

For stool sample collection essentials criteria followed were :

1. Fresh stool samples
2. Receptacle was kept clean and without antiseptics.
3. Patients were instructed not to mix urine with stool.

Samples were taken to the microbiology department, within 30 minutes.

Preparation of Materials:

Two smear preparation; one unstained preparation and another stained with Iodine were made out.

a) **Wet Saline Method**

Minute position of faces is diluted with normal saline 0.9% and a drop of it is taken on a clean microscopic glass slide. A coverslip No 1 or No 0 is then gently put over it to spread out the emulsion. Unstained preparation is specially useful for demonstration of actively motile forms of parasites like E. histolytica.

b) **Stained Preparation:**

Staining done by Lugolis Iodine by schaudinn's fluid for permanent preparation. Parasites were evaluated using conventional simple light microscope (NIKON).

c) Floatation technique:-

Fecal materials were dissolved in a solution which has higher density than eggs and hence floatation of egg useful in detecting parasites.

d) Sedimentation technique:-

Fecal material were dissolved in solution of density below that of eggs. So egg will be concentrated at the bottom.

1. Formal ether saline (Ritchell's method modified) and Formol ether I_2 methods were used.

e) Modified Acid Fast Staining Method:-

It was adopted to detect cryprosporidiosis and isosporodiosis. The details are given below.

Preparation of smear

1) With Diamond pencil write lab no were written in full one glass slide for each specimen.
2) Using 5mm internal diameter 24 SWG Nichrome wireloop smear were prepared with a portion of thickest part on about 2/3rd of slide.
3) Slides were air-dried.
4) The slides were transferred to hot plate 80^{o}C and were fixed for 10 mts.

Staining: 'Kinyoun' staining

This staining technique was adopted for Acid Fast Staining method.

1) The slide were placed on staining track with the smear part upper most, the slides not touching each other.
2) The slides were covered with carbol fuchisn stain, leave for 1 – 10 minutes.
3) With running tap water, the slides were washed well with water.
4) Slides were decolourized by covering completely with acid alcohol for 1-2 minutes.
5) Slides were washed again gently with running tap water.
6) Slides were counterstained with 1% methylene blue for 30 sec.

7) Slides were wash as before with water and the slides were sloped on hot plate and smear were read.

Cryptosporidium appeared as round or oval shaped pink coloured oocysts measuring 4 – 6 μm.

Isospordium appeared with mature or immature oocysts measuring 20-40 μm.

CD4 Count:

Method of collection for CD4, CD8 and CD4/CD8 ratio was as described below. 1ml of Blood was taken in the morning to avoid diurnal variation in a special tube (vacutainer) containing K_3 EDTA solution and was thoroughly mixed and immediately transported under room temperature without refrigeration as it was falsely increases the count.

CD4, CD8 ratio were done by immuno cytometry using. Becton dickinsin immuno cytometry system. There is substantial variation in CD4 cell counts attributable to counting technique, diurnal and seasonal variations, use of drugs like steroids and possibly other factors like intercurrent illness. The values which is the product of WBC, percentage of lymphocytesand the percentage of lympocytes that expressed on the CD4 membrane.

In order to reduce variability, each test should be done at approximately the same time of day using a single laboratory. Large fluctuation may reflect the technology of test rather than the biology of the disease. Overall trend of CD4 count is more important than any single value.

Guidelines recommended by CDC, USA (MMWR 41, RR 8, 1992) were adopted to estimate the CD4 and CD8 count. It recommends that,

(i) hematological test should be performed with in 6 hours. (ii) automated lymphocyte count should be done (iii) Immuno phenotyping should be done within 30 hours and (iv) a monoclonal antibody panel should be used that will account for all lymphocytes in the sample as an internal control; an abbreviated panel may be used for sequential follow up.

There are substantial diurnal changes with a nadir at 12.30 pm and peak at 8.30 pm. Seasonal month to month changes are also seen in healthy adults. Acute administration of steroid may cause profound decrease in CD4 count.

Analysis:

Data were entered in Microsoft Excel Spreadsheet and were analysed using statistical package.

Conflict of interest: Nil

Financial support: Nil

Limitation of the study:

1) Infective status of the parasitic infestations were not confirmed by serological studies.
2) Re-evaluation of the negative cases was not attempted[22].
3) Therapeutic aspects of those cases with intestinal parasitosis were not brought out.
4) Post ART follow up of the cases receiving ART was not analysed in relation to non ART cases.

1) Mora CA, Altieri R, Davario M, Lasala M.B, Division of infectious disease, J.M. San martin Hospital school of medicin, Buenos Aires Argentina. 11th international AIDS conference. Int. Conf.AIDS.1996. July 7-12 :11 :296 Abstract No 4624.

According to the study out of 376 HIV positive patients who were followed from 1.1.1987 to 12.3.1993, parasites were found in 171 patients of which E.Histolytica were found in 48 patients (12.77%), E.coli were found in 46 patients (12.23%), Giardia were found in 39 patients (10.37%) D. Fragilis in 23 patients (6%), cryptosporidiosis were fount in 11 patients (3%) and isospora belli in 4 patients (1%). There is significant correlation between cryptosporidiosis and diarrhoea when CD4 count is below 200 cells/mm^3.

2) Coppola MD, Romana J, Altiers, Intestinal Parasitosis from 1992 to 1995; www. Nebi.nlm.nih.gov/

Out of 1200 patients studied 703 patients were HIV negative and 497 were HIV postive. Of which 203 patients with symptoms of diarrhoea from the study Giardiasis were found among the HIV negative patients and cryptosporidiosis found mainly in HIV positive patients. According to the study cryptosporidiosis were found in 54 HIV positive patients and only in 3 HIV negative patients.

3) Ebba Abate, Endris Mekonnen, Journal of Ethiopian medical Practice, Volume 3: No:2 (2001). 3:2 – 64-69.

Of the 100 patients studied 50 patients were HIV positive and 50 patients were HIV negative. Of them cryptosporidiosis were found among 17% of Hiv patients and 2% of isospora belli were found and 48% of infection were mixed one. Of which cryptosporidiosis were significantly associated with HIV positive patients.

4) Brandonsio. O, P.Maggi, G. Angarano et al. Prevalence of cryptosporidiosis in HIV infected patients with diarrhoea. European Journal of Epidemiology 9:2:190-194.

According to the study 51 HIV positive patients presents with diarrhoea were included of which 17 cases of cryptosporidiosis were reported (33.7%).

5) Alijandro Carabello, Indhira Ozozco, Bol.Chil Parasitol intestinal parasitic infection in HIV positive individuals in south eastern Venezuela.

According to this study cryptosporidiosis were found in 22.8%, Ascaris lumbricoides in 14.2%, Hookworm in 8.6% and trichuris trichuria in 8.6%, I. belli in 2.9%. According to htem 56.5%, cryptosporidiosis is found and CD4 count <200 cells/mm^3 and 32% between 200-500 cells/mm^3 and 12% when CD4 count above 500 cells/mm^3 E.Histolytica were found in 28.9% when CD4 <200 cells /mm^3 and 17.4% when CD4 count between 200-500 cells/mm^3 and 53.7% when CD4 count above 500 cells/mm^3.

6) Kava Mohandas, Rakesh sengal, Prevalence of Intestinal parasitic pathogen in HIV positive patients in northern India. Jpn, J. Infect.2002.Dis :55: 83-84.

Out of 120 HIV positive patients 36 patients were infected with intestinal parasites, out of which 21 patients were associated with diarrhoea.

Cryptosporidiosis were found in 10.8% of which 92.3% were presented with diarrhoea. Giardia 8.3%. Isospora belli 3% and E.Histolitica 2.3%.

RESULTS

The observations made in the study are tabulated and described under:

1) Sex

Among 120 patients studied 62 were males and 38 were females. In this study male and female do not differ with regard to HIV status or the presence or absence of diarrhoea. The details are given in the Table 1 below.

Table 1: Distribution of cases and control in relation to the gender

	HIV positive cases		**Total**	**HIV negative control**
	With Diarhoea*	With out Diarhoea		
Male*	41	21	62	20
Female	39	19	58	20
Total	80	40	120	40

* not significant P value = 0.89722

2) Age

Diarrhoea when analysed in relation to age group it was seen more among those below the age of 40 years than in those above 40 years and the difference was statistically significant. At the same time it was independent of gender. Details are shown in the table below.

Table 2: Distribution of cases and control in relation to age

Age group years	**HIV Positive cases**						**HIV Negative control**		
	With Diarhoea			Without Diarhoea					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
< 30*	9	15	24	6	5	11	7	7	14
31 – 40*	21	15	36	8	9	17	8	8	16
41 – 50	7	4	11	4	2	6	4	4	8
> 50	4	5	9	3	3	6	1	1	2
Total	41	39	80	21	19	40	20	20	40

* significant

Distribution of cases and control in relation to age.

Out of 120 HIV positive patients 71.8% were below the age group of 40. The age range of HIV patients varied from 20 to 57 years. The mean age was 35.28 (SD ± 9.03). There was no significant difference among gender with reference to the age. The results are tabulated below:

Table 3: Distribution of cases and control in relation to age.

	Male	**Percentage**	**Female**	**Percentage**	**Total**	**Percentage**
< 30	22	26.8	27	34.6	49	30.6
31 – 40	37	45.1	32	41	69	4.3
41 – 50	15	18.3	10	12.8	25	15.6
> 50	8	9.8	9	11.5	17	10.6
Total	82		78		160	100

3) Domicile Pattern

57.5% were resided in rural area and 42.5% were resided in urban area. Details are provided in the Table below.

Table 4: Domicile Distribution

	Male	**Female**	**Total**
Rural*	48 (58.5%	44 (56.4%)	92 (57.5%)
Urban*	34 (41.5%)	34 (43.6%)	68 (42.5%)
Total	82	78	160

P value = 0.78566 * not significant

4) Educational Status

Out of 62 cases of HIV positive male patient 9.7% were illiterates, 19.4% had primary, 29% had middle school, 35% had higher secondary school, 3.2% had college and 1.1% had technical education. Among the females 25.9% were illiterates and 29.8% had primary, 22.4% had middle school and 20% had higher school, none of the female had college education. Details are provided in the following table.

Table 5: Educational status of HIV patients

	Male	**Percentage**	**Female**	**Percentage**	**Total**
Illiterate	6	9.7	15	25.9	21
Primary	12	19.4	17	29.3	29
Middle	18	29.0	13	22.4	31
Higher	22	35	12	20.7	34
College	2	3.2	0	-	2
Technical	2	1.1	1	3	3
Total	62		58		120

5) Marital Status

While majority 96.9% were married, only 3.1% were unmarried.

6) Occupation

Various occupational categories are noted. They were agricultural, labourers, transport, crews, skilled worker, load men, and other. Most of the women were unemployed.

7) Sexual Behaviour

Of the study group most of the men (91.2%) admitted promiscuous sexual behaviour, while 8.8% men and all women denied history of promiscuits.

8) Housing Status

More than 80% of the rural people lived under thatched shed where as rest lived in concrete buildings.

9) Water sources

Both cases and controls were depended on common water sources.

10) Hand Washing

Irrespective of literacy status, hand washing habits and other hygienic practices were far from satisfactory among cases and controls.

11) Clinical Examination

Most of HIV positive patients were emaciated with coated tongue and ill looking sunken eyes. Most of them were dehydrated. There were no pedal oedema. Their vitals were stable and their urine output were satisfactory. Their cardiovascular, respiratory, central nervous system examination findings were normal. There was no abdominal distension and no abdominal mass.

12) Diarrhoeal groups

In the present study diarrhoea was independent of gender. The results are tabulated below.

Table 6: Distribution of cases in relation to diarrhoea and gender patients.

Sex	**With Diarhoea**			**Without Diarhoea**
	< 2 weeks*	> 2 weeks	Total	
Male*	19	22	41	21
Female	20	19	39	19
Total	39	41	80	40

* not significant P value = 0.65056

Diarrhoea in relation to age

Duration of diarrhoea was independent of distribution of age. The results are tabulated below.

Table 7: Distribution of diarrhoea in relation to age

Age group years	**With Diarhoea**						**Without Diarhoea**		
	< 2 weeks			> 2 weeks					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
< 30	3	8	11	6	7	13	6	3	9
31 – 40	10	7	17	11	8	19	8	9	17
41 – 50	4	2	6	3	2	5	4	2	6
> 50	2	3	5	2	2	4	3	3	6
Total	19	20	29	22	19	41	21	19	40

P value = 0.303 Not significant

13) CD4 Count

CD4 status among the cases are shown in the table given below:

CD4 count / mm^3	With diarrhoea* (N = 80)	Without diarrhoea (N=40)
Range*	28 – 881	36 – 830
Mean	252.81	300.23
SD	184.27	235.63

* Significant

Mean CD4 status those with diarrhoea was significantly lower than those without.

Distribution of CD4 counts in HIV patients

Irrespective of gender those who had diarrhoea, CD4 counts were lower. The distribution of CD4 in relation to gender and diarrhoea is shown in the table 9.

Table 9: Distribution of CD4 counts in HIV patients

	With Diarhoea						**Without Diarhoea**					
	M	%	F	%	T	%	M	%	F	%	T	%
< 50	2	4.9	6	15.4	8	10	3	14.3	0		3	7.5
51 – 100	2	4.9	4	0.3	6	7.5	4	19	1	5.3	5	12.5
101 – 200	13	31.7	12	30.8	25	31.3	4	19	4	21.1	8	200
201 – 500	19	46.3	13	33.3	32	40	6	28.6	10	52.6	16	40
> 500	5	12.2	4	10.3	9	11.3	4	19.0	4	21.1	8	20
Total	41		39		80	100	21		19		40	100

10) Distribution of parasites among cases and control are provided below table no.10

Table 10: Distribution of parasites among cases and control

	Intestinal parasites	**With diarhoea**	**Without diarhoea**	**Control**
1	Crypto	10	2	2
2	E.Histo	6	3	2
3	E Coli	7	2	3
4	Ascaris	4	3	3
5	H.nana	1	0	1
6	Ankylostoma	1	1	1
7	Giardiasis	1	2	3
8	Mixed	13	0	1
		43	13	16

P = 0.10214

* Statistical significance could not be assessed as the numbers are low.

Analysis of Intestinal parasitosis is provided in the table 11, in relation to diarrhoea.

Table 11: Prevalence in internal parasites in the study group.

	HIV +ve		Total	%	HIV -ve	Total	%
	With D	Without D					
Crypto	21	2	23	19.2	2	25	27.5
E.Histo	16	2	18	15.0	3	21	23
E.coli	12	3	15	12.5	3	18	19.7
Ascaris	6	3	9	7.5	2	11	12.1
H.nana	1	0	1	0.8	1	2	0.02
Giardiasis	3	2	5	4.2	4	9	0.09
Ankylostoma	2	1	3	2.5	1	4	0.04
Isospora	1	0	1	0.8	0	1	
	62	13			16	91	100
	80	40	120		40		

Some of them had more than one organisms in their stools. Overall parasitic infestation was significantly more among HIV positive group. Commonest parasitosis among HIV postive group were cryptosporidium (19.2%), followed by E.Histolytica (15%), E.coli (12.5%) ascaris (7.5%), H.nana (0.8%), Giardiasis (4.2%), Ankylostoma (2.5%) and Isospora (0.8%). Of the HIV positive patients 62 of 80 (77.5%) had diarrhoea where as it was 13 of 40(16.2%) non-diarrhoea.

Distribution of cases in relation to CD4 and cryptosporidiosis is provided in table 12.

Table 12: Distribution of cryptosporidiosis and CD4 count

CD4 count		**Diarhoea***		
	No	< 2 weeks	> 2 weeks	Total
< 200*	44	8	5	13
> 200	76	4	4	8
Total	120	12	9	21

P value < 0.0001 * significant

Cryptosporidiosis was significantly more in those with CD4 count below 200 thereby indicating the susceptability of cryptosporidiosis increases significantly more when CD4 count is below 200.

The mean CD4 around which the cryptosporidiosis present with diarrhoea is 192.10. (S.D. 135.03).

Table 13: Distribution of Ehistotlynca and CD4 count

CD4		**With diarhoea**		
	No.	< 2 weeks	> 2 weeks	T
< 200	44	1	3	4
> 200	76	6	6	12
	120	7	9	16

When the CD4 count and E. Histolytica was analysed E.Histolytica was significantly more among those whose CD4 count above 200.

Table 14: Distribution of E.coli and CD4

CD4 count	Diarrhoea			Non diarhoea	
	Acute	Chronic	Total		
< 200*	3	3	6	2	8
> 200	2	4	6	1	7
Total	5	7	12	3	15

P value = 0.55818 * not significant

Distribution of E.coli and CD4 count were not significant.

Distribution of cryptosporidiosis in relation to cases and control

Table 15: Distribution of cryptosporidiosis in relation to cases and control

Cryptospordium	With D	Without D	Control
-ve	59	38	38
+ve*	21	2	2
Total	80	40	40

P value = 0.00531 * significant

Cryptosporidiosis statistically significant in diarrhoeal group when compared with non diarrhoeal.

Distribution of E.Histolytica in cases and control

Table 16: Distribution of E.Histolytica in cases and control

E.Histo	With D	Without D	Control
-ve	64	38	38
+ve*	16	2	2
Total	80	40	40

P value = 0.03006 * significant

E.Histolytica statistically significant in diarrhoeal group when compared with non diarrhoeal group.

DISCUSSION

Intestinal parasitosis due to various organism were found among HIV positive population globally but the prevalence vary country to country, region to region. The probable explanation offered were socio economic status, food habits, hygienic practices and health status of the individual.

The present study consists of 62 male patients and 58 female patients. Lack of gender difference may be due to inclusion of cases in view of rigid criteria adopted.

In present study most patients of HIV positive patients 73.6% were aged 20- 39 years showing preponderance of infection with sexually active age group, this causes great concern because morbidity and mortality in these age group reflects badly on health status of the Nation and loss of Human resources and when they die, leaving behind many orphans which will be a great burden to the society.

In present study, rural preponderance was observed. This reflects the type 4-pattern spread from Urban to Rural Areas; this is because the Rural People often traveling to Towns and Cities in searching of Jobs with increased level of ignorance and illiteracy among the Rural Population.

Of the male only 9.7% were illiterates but in female illiteracy among 26%, which highlights increasing the literacy rate may bring down the incidence of HIV infection. In this study the commonest mode of transmission of HIV were found to be Heterosexual.

Studies in India, indicated that Diarrhea has been the third common clinical presentation in HIV patients (Merchant& Sharoff 1988)- Diarrhea is a cardinal symptoms of HIV infection, and is considered as AIDS defining condition (Mith&Jana1988) – In the present study HIV patients with Diarrhea accounts for 80/ 120 cases.

Opportunistic intestinal parasitic infection should be expected in HIV infected patients who presents with diarrhea (Viroj 2001)-In the present study, diarrhoea were noticed in 39 patients (32.50%) less than 2 weeks duration and those with > 2 weeks duration (34.20 %) 41 patients.

According to Okudua.M, *et al* distribution of intestinal parasitic infection among HIV infection subjects in Abeokuta Nigeria. Overall parasitic infection rate is 28.4%, According to Moroca, *et al* parasitic infection in HIV is 45.5% and in Vinoj in Thailand the prevalence of intestinal parasitic among the patient is 50%

In the present study overall percentage of patients affected with intestinal parasites

was 46.9% in HIV positive patient the percentage of patient affected with intestinal parasite is 46.7%

According to Javid *et al* their study showed that diarrhoea among the HIV infected group with CD4 > 500 CELLS / mm^3 was 14.7% and in group with 200-500 cells/mm^3 , here were 29.8% and in HIV patients with CD4 <200 cells / mm^3 this rate was 56% which was significantly compared with the former CD4 groups. Of the study, cryptosporodiasis were found in 56.5% in the group of CD4 count <200 cells /mm3

Among those with E.coli , 28.9% were found to have CD4 count <200 cells /mm3 and 17.4% in the group of 200-500 cells / mm^3 and 20% in the group of CD4 count >500 cells/ $mm^{3.}$

According to Mora *et al*, 45.5% patient had one or other intestinal parasites. Among them 48 patient (12.77%) had E.histolytica, E.coli were found is 46 patient (12.23%) giardia (10.3%) 3 a patient, cryptosporodium were found in 11 patient (3%). There is significant correlation between cryptosporodiasis and diarrhoea and CD4.

According to Minta *et al*, 46.7% of them had intestinal parasites among the HIV groups. Cryptosporodium were found 26.7%, the E.Coli in 17.4%, Blastosis hominis in 8% ,E.nana in (7%) isopora belli in (7%) mixed were 10 cases.

According to Ebba Abate *et al*, cryptosporodiasis were found among 17 % of HIV patient. Isospora were present among 2% and mixed were 38% cryptosporodium were significantly associated with HIV positive cases[37].

According to Brandonsior.O *et al* of the 51 HIV patient presented with diarrhoea, 17 cases were cryptosporodium (33.3%).

Alejandro carabello *et al*, observed cryptosporodium were found in 22.8%, Ascaris lumbricoides, in 14.2% hook worm in (6%) trichuris trichuria in (8.6%), isosporo belli in 2.9% in the HIV patient presented with diarrhoea.

According Kava Mohandas *et al* observed Cryptosporodium were found in 10.8% of which 92.3% were presented with diarrhea.

Mackenzie , et al. observed the massive out break in milwakee of cryptosporidium infection transmitted through the public water supply, cryptosporodiasis can be acquired to any time during the course of HIV infection. Major morbidity and mortality occur almost exclusively in patients with CD4 count below 180 cells/mm3 above this level spontaneous recovery occur.

Diarrhoea has been significantly associated with cryptosporodium, giardia and isospora (cemimerman et al 1999). According to reports from Chandigarh in India, the most common parasite associated with diarrhoea was cryptosporidium parvum. 75% AIDS patient who tested for intestinal parasites had diarrhoea (Mohandas et al 2002)[41].

Of the HIV positive patient total parasites detected were 75 (62.5%) and in HIV negative patient, the parasite detected were 16 (40%) which also implies parasites in HIV patient is more among HIV positive patient.

In the present study the prevalence of intestinal parasites in HIV patient were 46.7% among them cryptosporidium was found in 19.2% followed by E.Histolytica 15%, E.coli 12.5%, Ascaris 7.5%, H.nana 0.8%, Giardiasis 4.2%, Ankylostoma 2.5% and isospora 0.8%.

Hence cryptosporidium is mainly presented with diarrhoea, and of the parasite detected crypto spordium is the most common parasite detected in HIV patient and CD4 count was low in this study as in other studies.

The relative risk for cryptospordiasis is about 7.6 times higher in HIV positive patient when compared to non HIV patient.

The present study as well as published reports clearly revealed that AIDS patients are prone for diarrhoea and the commonest organism being, cryptosporidium and the source being water supply.

In view of that, these HIV patient irrespective of the diarrhoea status should be motivated for hygienic practices and constantly monitored for CD4 count. If they develop diarrhoea one should look for unusual organism carefully and they should be treated accurately.

CONCLUSION

1) Intestinal parasitosis was significantly more among HIV positive population.
2) The prevalence of intestinal parasitosis among HIV positive status was 47% (43).
3) Cryptospordiosis was the most predominant one among HIV positive patients and it was significantly more if CD4 cell counts was below 200 cells/$mm^{3.}$
4) The prevalence of E.Histolytica was significantly more among those with CD4 cell counts more than 200 cells/$mm^{3.}$
5) All these patients hailed from low socio economic status.
6) Their educational status, water supply system, hand washing habits were suboptimal.

SUMMARY

Socio economic conditions, educational status and unhygienic practices contribute for intestinal parasitosis. Since large number of HIV positive population belong to below poverty line, an attempt was made to study intestinal parasitosis among HIV positive population.

A total of 120 (M = 62, F = 58, Mean age = 35.28) HIV positive adults who satisfied a rigid selection criteria were screened for associated intestinal parasitosis and diarrhoea 40 healthy HIV negative non diarrhoeal population (age & sex matched) were kept as control. They were subjected to sociodemographic, clinical and laboratory evaluation.

Intestinal parasitosis were significantly more among HIV positive patient and the prevalence was 46.7% (43).

Among the parasitosis cryptosporidosis dominated 19.2% (23) followed by E.Histolytica 15.0% (18), E.coli 12.5% (15), Ascaris 7.5% (9), H.nana 0.8% (1), Giardiasis 4.2% (5), Ankylostoma 2.5% (3), Isospora 0.8% (1).

Cryptosporidiosis was found significantly more in those with CD4 counts less than 200/mm^3 thus indicating their susceptibility of cryptosporidiosis when CD4 counts is lower.

E.Histolytica was found significantly more among those with CD4 cell counts more than 200/mm^3.

Since the hygienic environment and hygienic practice far from satisfactory all of them were educated to adopt hygienic practice. It is suggested that to have routine evaluation of AIDS cases with diarrhoea for common and uncommon pathogen in order to provide appropriate therapeutic measures.

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MASTER CHART

Sl. No.	Age	Sex	R/U	Ht (cm)	Wt (Kgs)	BMI	CD4	CD8	Ratio	Wet.Saline	Wet.Iodine	Floatation	Fo ether
1	45	M	U	151	41	17.98	389	1815	0.21				
2	28	F	R	149	58	26.12	452	1299	0.35				
3	24	M	R	151	44	19.3	159	697	0.23		E.C		E.C
4	42	M	U	159	40	15.82	176	631	0.28				
5	32	M	R	154	41	17.28	332	1005	0.33				
6	35	F	U	168	49	17.36	37	612	0.06				
7	29	F	R	161	35	13.55	76	799	0.1				
8	40	F	U	165	59	21.67	428	2000	0.21		E.C	E.C	
9	35	M	R	158	39	15.62	120	796	0.15				
10	30	M	R	159	36	14.24	172	516	0.31				
11	51	M	R	157	32	12.98	433	894	0.48				
12	42	F	U	162	57	21.72	123	656	0.19				
13	36	M	R	167	64	22.95	256	778	0.32				
14	21	F	R	151	39	17.1	235	1457	0.16	E.H			
15	35	M	U	164	40	14.87	204	1127	0.18		E.C, E.H		
16	32	F	R	147	59	27.3	101	650	0.13				
17	39	M	R	158	32	12.82	225	989	0.22				E.H
18	36	M	U	157	41	16.63	224	490	0.05				G
19	26	F	U	161	40	14.34	433	894	0.48				
20	22	F	R	156	44	18.08	233	1318	0.18				

21	33	M	U	151	40	17.54	38	145	0.26	E.H	E.H		
22	30	M	R	158	34	13.62	219	962	0.23				
23	33	M	R	154	41	17.29	328	1841	0.28				
24	52	F	U	151	46	20.18	309	2000	0.15				
25	35	F	R	154	37	15.6	311	798	0.32				
26	33	M	U	156	36	14.79	350	2000	0.17		E.C		
27	25	M	R	142	46	22.81	721	1290	0.56				
28	25	F	U	148	53	24.2	252	1191	0.21				
29	24	M	U	168	44	15.6	489	1330	0.37				G
30	32	M	R	172	50	16.9	120	796	0.15				
31	34	F	R	154	31	13.07	174	1405	0.12	E.H			
32	31	F	U	160	38	14.84	148	407	0.41				H.N
33	42	F	R	152	57	24.67	171	1673	0.1		E.C	E.C	
34	34	F	R	156	34	13.97	82	1165	0.07	E.H	E.H		
35	52	M	U	145	45	21.4	120	796	0.15				
36	31	F	R	156	36	14.8	172	560	0.31		E.C		
37	53	M	R	163	48	18.07	291	864	0.34				E.H
38	32	F	R	148	57	26.02	292	798	0.37				
39	51	F	U	154	43	18.13	36	480	0.08				
40	32	M	R	163	44	16.6	212	634	0.33				
41	51	F	R	145	42	19.97	202	720	0.3	E.H			
42	31	F	U	149	40	18.01	195	2020	0.1				
43	21	F	R	148	29	13.23	694	2080	0.35	E.H	E.H/ A.L		E.C/AL
44	22	F	U	150	43	19.11	830	936	0.89		E.H		E.H
45	20	F	R	152	36	15.58	315	1858	0.17				E.H
46	44	M	U	157	41	16.63	196	640	0.31			E.C	

47	30	M	R	171	48	16.42	180	1200	0.15				
48	54	F	R	153	44	18.8	128	1496	0.09				ANKY
49	33	M	R	148	29	13.23	34	306	0.11				
50	51	M	U	166	37	13.43	82	1165	0.07				
51	44	M	R	155	34	14.15	281	883	0.33				
52	31	F	R	167	36	12.9	84	1284	0.07				
53	35	F	U	157	35	15.01	165	781	0.21		AL		AL
54	32	M	U	154	35	14.75	532	1320	0.04		E.H		E.H
55	34	F	R	170	36	12.45	197	458	0.43		AL		AL
56	32	M	R	154	35	15.15	514	2000	0.26		E.H	E.C	E.H
57	34	F	R	161	37	14.27	104	379	0.27				
58	28	F	U	148	23	10.5	46	786	0.06				
59	32	M	R	172	50	16.9	356	815	0.44				
60	34	M	U	164	54	20.01	602	1366	0.44				
61	30	F	R	161	35	13.5	114	608	0.19		AL		AL
62	27	M	R	157	46	18.66	198	407	0.49				
63	43	F	R	152	40	17.31	579	1179	0.49		E.H		E.H
64	38	M	R	164	36	13.38	335	586	0.58				
65	36	F	R	148	34	15.52	47	426	0.11		E.C		E.C
66	40	M	R	162	42	16	881	1435	0.61				E.H
67	32	M	U	163	36	18.54	330	742	0.44		AL		AL
68	30	F	U	161	36	13.88	253	1895	0.13				
69	33	M	R	163	39	14.67	183	925	0.02		E.H		E.H/G
70	44	M	R	160	45	17.57	204	1280	0.19				
71	51	F	R	153	47	20.08	28	358	0.07				
72	32	M	U	170	51	17.05	180	736	0.24		AL		AL

73	47	M	R	158	41	16.42	204	1227	0.18				
74	25	F	R	156	36	14.79	508	736	0.69		E.H/E.C		E.H/E.C
75	43	F	U	150	42	18.67	87	1046	0.08				
76	27	F	R	147	33	15.27	37	768	0.05		E.C		E.C
77	30	F	U	152	44	18.04	179	562	0.31				ANKY
78	43	M	R	165	36	13.22	198	962	0.21				
79	27	M	U	166	37	13.43	68	421	0.16				
80	25	M	R	163	47	17.69	112	566	0.22				
81	21	M	U	161	34	14.36	198	523	0.38				
82	40	F	U	153	36	13.37	152	821	0.19				
83	31	M	U	163	41	15.43	186	964	0.19				
84	34	M	R	168	49	29.17	120	730	0.16	E.C	E.C	E.C	E.C
85	39	F	R	155	33	13.73	263	938	0.28				
86	23	M	R	176	56	18.08	614	1768	0.35				
87	42	M	R	160	45	17.58	149	1666	0.09				
88	29	F	U	145	36	17.12	52	391	0.13				
89	37	F	R	151	31	13.06	196	460	0.46				
90	35	M	R	162	44	16.77	204	642	0.32				
91	29	M	U	161	40	15.43	71	560	0.13		E.C		E.C
92	36	M	R	154	52	21.93	393	>2000	>0.20				
93	27	F	R	163	39	14.7	281	863	0.33				
94	34	F	U	151	38	16.67	830	936	0.89				
95	26	M	U	163	39	14.7	243	1215	0.2				
96	42	F	R	152	35	15.15	146	1730	0.08				
97	37	M	R	154	39	16.45	74	773	0.1				
98	33	F	U	148	57	26.02	378	<2000	>0.19	E.H	E.H		E

99	51	F	R	150	46	20.44	793	1039	0.76				
100	24	M	U	166	40	14.52	82	1165	0.07				ANKY
101	24	F	R	151	34	14.91	830	936	0.89				
102	38	M	R	168	49	17.36	44	660	0.06				
103	33	F	U	154	39	16.45	281	863	0.33		E.H		E.H
104	42	F	R	146	52	24.4	216	1583	0.14				ASCAR
105	23	M	R	163	47	17.7	76	799	0.1				
106	43	M	R	157	39	15.82	792	1215	0.65				
107	23	F	U	155	35	15.05	204	1127	0.18				
108	51	F	R	152	42	18.18	256	1585	0.16				
109	57	M	U	170	42	14.53	42	428	0.1				
110	44	M	R	167	52	18.65	553	1760	0.03		E.C		
111	22	F	U	146	42	19.7	436	1522	0.28				
112	34	M	R	161	44	16.98	64	1029	0.06				ASCAR
113	32	F	U	149	43	19.39	210	8020	0.26				
114	49	M	U	160	38	14.84	286	937	0.3				
115	53	F	U	156	43	17.67	194	1236	0.16				
116	51	M	R	158	45	18.03	36	572	0.06				
117	31	F	R	154	41	17.29	291	864	0.34				ASCAR
118	32	M	R	166	43	15.6	252	1191	0.21				
119	57	M	R	169	44	15.41	311	978	0.32				G
120	35	F	U	148	39	17.81	526	1840	0.28				G
121	41	M	R	162	71	27.1							
122	24	F	U	151	38	16.7				E.COLI			E.COL
123	33	F	R	153	49	20.9							
124	26	M	U	161	59	21.6							

125	31	M	U	171	74	25.3							GIARD
126	39	M	U	163	59	22.21							
127	23	F	U	157	61	24.75							
128	26	M	U	169	72	20.21							
129	34	F	R	162	63	28.38							
130	33	F	U	152	57	24.67							
131	51	F	R	154	73	30.74				E.COLI			E.COL
132	21	F	U	149	43	19.37							
133	23	M	U	162	45	17.1							
134	24	F	R	155	49	20.4							
135	29	F	U	149	44	19.8							
136	21	M	R	167	52	18.65				E.HISTO	E.HIST		E.HIST
137	34	F	R	143	48	23.43							
138	25	M	U	162	57	21.72							ASCAR
139	21	F	U	159	69	27.89							
140	37	M	R	169	78	27.31				E.COLI			E.COL
141	26	F	R	148	45	20.5							
142	23	M	U	165	60	22.04							
143	33	F	U	152	55	23.81							ANKYL
144	37	M	U	171	82	28.04							
145	42	F	R	162	80	33.05							
146	33	M	U	165	86	31.59							
147	43	M	R	171	92	31.46							
148	52	M	U	177	89	28.4							
149	41	F	R	148	50	29.3							
150	41	M	R	168	77	27.28							GIARD

151	34	F	U	172	74	25.01							
152	43	F	U	161	69	26.62				E.COLI			E.COL
153	29	F	U	1174	82	27.08							
154	49	M	R	173	90	30.07							
155	37	M	R	147	49	22.35							
156	33	F	U	152	61	25.72							GIARD
157	36	M	U	177	86	27.45							
158	49	F	U	161	73	28.16							ASCAR
159	37	M	R	154	52	29.93							E.HIST
160	32	F	R	167	68	25.28							H.NAN

PROFORMA

(Prevalence of intestinal parasites in HIV infection)

Name :

Age :

Sex : Male / Female

ID No. :

Ward No. :

Education status :

Marital Status : Single / Married / Separated

Occupation :

Domiciline : Rural / Urban

Behaviour : Promiscuity / Previous STD

CF:

Complaints and duration:

H/o treatment taken : Yes / No

H/o needle prick : Yes / No

Vitals:

PR : Ht :

BP : Wt. :

R.R. : BMI :

Temp. :

CVS :

Rs. :

Abdomen :

CNS :

Investigation:

	Positive	Negative
First Elisa	☐	☐
Second Elisa	☐	☐

CD4 count :

CD8 count :

CD4 / CD8 ratio :

Motion Examination:	Cry	Ec	Eh	Asc	Iso	H.n	Ank	others
1) Wet I_2 method	☐	☐	☐	☐	☐	☐	☐	☐
2) Wet Saline method	☐	☐	☐	☐	☐	☐	☐	☐
3) Floatation technique	☐	☐	☐	☐	☐	☐	☐	☐
4) Formal ether saline	☐	☐	☐	☐	☐	☐	☐	☐
5) Formal ether I_2	☐	☐	☐	☐	☐	☐	☐	☐
6) Modified AFS	☐	☐	☐	☐	☐	☐	☐	☐