

ORIGINAL ARTICLE

## About Intestinal Parasitic Infections in a Cohort of HIV-Infected Patients

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### ABSTRACT

*Our objective was to determine the prevalence of Parasites pathogens among patients with Human Immunodeficiency Virus (HIV) infection. Furthermore, intestinal parasite infection, which is also one of the basic health problems in these patients. A cross-sectional study was conducted among 80 men and 150 women receiving ART. A study of stool samples from 230 Senegalese HIV seropositive individuals with different immune status was performed at Bio-Amarie Biology Laboratory, Kaolack, Senegal. Data were collected through questionnaires and chart reviews. Logistic regressions were performed to isolate determinants of adherence. Each patient was examined for CD4 count and screened for intestinal parasite. 65.5% of the parasites were detected from the volunteers with CD4 count less than 200 cells/mm<sup>3</sup>. Among the volunteers with intestinal parasites, 8.2% had CD4 count more than 350 cells/mm<sup>3</sup>, 26.3% had CD4 count 200-350 cells/mm<sup>3</sup>. When the CD4 cell count was less than 100 cells/mm<sup>3</sup>, most predominant indicator intestinal parasite detected was *Ascaris lumbricoides*, *Giardia lamblia*, *Trichuris trichuria* (19.7%), followed by *Entamoeba histolytica* (16.4%). It may be concluded that in Senegal HIV seropositive individuals, intestinal parasite infections are still highly prevalent and improvement in sanitation and hygiene is the only way to improve the status, which policy making authorities may look for targeting*

**Key words:** HIV, Parasites, CD4, Senegal

### INTRODUCTION

Human immunodeficiency virus (HIV) infection, a worldwide infection, is a serious problem in the present day. One of the major health problems among HIV seropositive patients is superimposed infection due to the defect of immunity.

Senegal has one of the Africa's lowest HIV/AIDS infection rates less than 2% but vulnerable groups such as sex workers have higher HIV prevalence. Currently [1], HIV infection among legal sex workers in Dakar has risen to 21%, compared to 1% 20 years ago. The rate is as high as 30% in the southern city of Ziguinchor [2]. Despite the low and stable HIV prevalence in Senegal, less than 1% in the general population, all genetic subtypes are documented in Senegal. The in-country genetic subtype distribution was [3]. Furthermore, intestinal parasite infection, which is also one of the basic health problems in tropical region .

### MATERIALS AND METHODS

This study was performed as a cross-sectional descriptive study. 230 HIV-seropositive individuals who visited the Bio-Amarie Laboratory of biology during January, 2009 – June 2011 were included in this study. All revealed no previous medical history of any drug therapy usage. Stool sample was performed by wet mount, formal-ether sedimentation technique and modified acid fast staining. All data from stool study was collected then analyzed using descriptive statistical analysis. Three milliliters of EDTA blood from each subject was collected for CD4 count. The CD4 count determination in this study was performed by automated flow cytometry analyzer, FACS Count and FACS Calibur[4]. All subjects were categorized by their immune status according to the 1993 revised classification system for HIV infection by CD4 T-cell categories [5].

### RESULTS

#### Study population

Participants in this study were representative of patients treated with ART in Kaolack. Most lived within the capital area (84.7%), had no high-school education (51.5%) and had no revenue or

earned less than 75\$ USD per month (63%). There were proportionally more women (65.2%) and 34.8% for men. Furthermore, patients were not married (60%) or at least divorced or separated (26.1%) (Table 1).

#### Adherence and treatment regimen

All patients were receiving triple ARV medication. 89.1% were on NNRTI containing regimens, and 9.1% were on protease inhibitor containing regimens. Patients were equally treated with ART for more 30 months. Almost half had been on therapy for more than one year. (table 1).

**Table 1.** Distribution of participants and prevalence of adherence according to context, socio-demographic characteristics, financial situation, social network and treatment characteristics

Sex					
Female	150	65.2	0.998		
Male	80	32.2			
Age					
≤30	20	08.7	0.484		
31-35	34	14.7			
36-40	75	32.6			
41-49	85	37			
≥50	16	07			
Demographic setting					
Urban	195	84.7	0.32		
Rural	35	15.3	4		
Religion					
Christian	16	07	<b>0.02</b>		
Muslim	214	93	<b>1</b>		
Education					
Not educated	120	52.1	0.560		
Elementary	72	31.3			
Secondary or more	38	16.6			
Occupation					
With salary	12	5.3	0.201		
Commission (service)	19	8.3			
Housewife	33	14.3			
Unemployed	166	72.1			
Marital status					
Married	32	13.9	<b>0.02</b>		
Single	138	60	<b>2</b>		
Divorced/separated/widowed	60	26.1			
<b>Financial Situation</b>					
Financial autonomy					
Yes	40	17.4	0.197		
No	190	82.6			
Revenue (\$US)					
No revenue	33	14.4	0.054		
< 75\$	145	63			
75\$ - 100\$	24	10.5			
100\$ - 175\$	20	8.6			
≥175\$	8	3.5			
Month on treatment					
1-6	02	78.9*	<b>0.004</b>	25	80
7-12	05	60.0		58	48
13-18	10	54.9		23	34
19-24	30	64.5		20	51
25-30	85	56.0		12	58
> 30	98	30.0*		22	31
Treatment characteristics					
Type of treatment					
NRTI-NNRTI	205	89.1	0.405		
NRTI-PI	21	9.1			
NRTI only	4	1.8			

During the period of study, Total 230 stool samples were collected from 230 HIV-infected patients who were visited at Bio-Amarie Laboratory of biology. The study population consisted of 31.3% patients with CD4 ≥ 350/ L, 28.7% patients with CD4=200-350/ L, and 40% patients with CD4 ≤200/ L, opportunistic intestinal parasites commonly detected in HIV/AIDS patients could be

detected in Senegal (Table 2). Out of the total intestinal parasites, the presence of *Ascaris lumbricoides* represents 27.9% of the total detected parasites. Among the total 122 volunteers harboring intestinal parasites, 65.5% of the parasites could be detected from the volunteers with CD4 count less than 200 cells/mm<sup>3</sup>. Among the volunteers with intestinal parasites, 26.3% ( had CD4 count 200-350 cells/mm<sup>3</sup>, 8.2% had CD4 count of more than 350 cells/mm<sup>3</sup>. When the CD4 cell count was less than 100 cells/mm<sup>3</sup>, most predominant indicator intestinal parasite detected was *A. lumbricoides* (27.9%), followed by *E. histolytica* (23.2%) which is an AIDS defining conditions (Table 3).

**Table: 2 Correlation of CD4 count and intestinal parasitic infection**

CD4 count/ mm <sup>3</sup>	cases without Intestinal Parasites	cases with Intestinal Parasites	Total no of subjects	Risk Ratio	95%CI	p value $\chi^2$ test
<200	12 (11.1%)	80 (65.5%)	92 (40%)	14.12	3.42 to 46.57	<0.001
200-350	34 (31.4%)	32 (26.3%)	66 (28.7%)	1.32	0.33 to 4.62	
≥350	62 (57.5%)	10 (8.2%)	72 (31.3%)			
Total	108 (47%)	122 (53%)	230 (100.0%)			

**Table: 3 Intestinal parasites and CD4 count**

Intestinal parasites	No of volunteers with CD 4 counts				Intestinal Parasite number	p value ( $\chi^2$ test)
	<100/mm <sup>3</sup>	100-200 /mm <sup>3</sup>	201-350 /mm <sup>3</sup>	> 350/mm <sup>3</sup>		
<i>A. lumbricoides</i>	12	8	2	2	24 (19.7%)	<0.001
<i>E. histolytica</i>	10	5	3	2	20 (16.4%)	
<i>G. lamblia</i>	6	10	6	2	24 (19.7%)	
<i>A. duodenale</i>	5	11	2	2	20 (16.4%)	
<i>H. nana</i>	3	3	1	1	8 (6.5%)	
<i>S. stercoralis</i>	0	2	0	0	2 (1.6%)	
<i>T. trichuria</i>	7	9	8	0	24 (19.7%)	
Total	43	48	22	9	122 (100.%)	

## DISCUSSION

In this study, the prevalence of intestinal parasite infection among HIV- seropositive individuals with different immune status was investigated. Present study result showed that intestinal parasitic infection could also be detected in 53% of HIV positive volunteers. Taking CD4 count category of ≥350 count/mm<sup>3</sup> as a reference, the risk ratio for intestinal parasitic infection in the category 200-350 count/mm<sup>3</sup> was 1.62 and for ≤ 200 count/mm<sup>3</sup> was 16.10 (Table 1). *Ascaris lumbricoides*, *Giardia lamblia* and *Trichuris trichuria* (19.7%) were the most common followed by *Entamoeba histolytica* (16.4%). Slightly higher prevalence of intestinal parasitosis 69.2% were found among HIV patients in Ethiopia [6] and (30.0%-35.7%) has been reported from HIV seropositive subjects in Kathmandu Valley by few previous focused studies [7,8]. In Zambia 80% of intestinal parasites were observed and 52.7% caused by *Ascaris lumbricoides* [9]. The prevalence of parasitic infections among HIV/AIDS subjects ranged from 18.4% to 76.2% in different parts of the world [10,11,12]. The finding of the present study was in agreement with the findings of Bachur [13,14,15,16]. In the present study it has been observed that the *Ascaris lumbricoides* accounts for 19.7% of the total parasitic infection, which is corroborating with the result of Bachur [13].

## CONCLUSION

It may be concluded that in Senegalese HIV- seropositive individuals, intestinal parasite infections are still highly prevalent. The importance of tropical epidemic intestinal parasite infections should not be neglected in HIV-infected patients. So that, stool examination is still a useful investigation. Improvement in sanitation and hygiene is the only way to improve the status, which policy making authorities may look for targeting.

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