Protozoan Diarrhoea in Human Immunodeficiency Virus Seropositive Patients: A Review

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Abstract

In both developing and developed countries, intestinal protozoa cause infections. Diarrhoea is a manifestation of parasitic infections. Most of these occur in developing countries, causing around 3-4 million deaths each year. One of HIV's most common symptoms is diarrhoea. Opportunistic and non-opportunistic organisms are the etiological agents. Opportunistic agents cause diarrhoea that is severe, persistent or chronic. A typical symptom of persistent diarrhoea in HIV/AIDS patients is the duration of diarrhoea for more than 4 weeks. Hence, this article discusses some literature on parasitic diarrhoea in patients with HIV/AIDS. It has been estimated that 4 billion cases of acute diarrhoea occur globally every year.In the world's developing nations, the economic effects of diarrhoea are more demanding. *Giardia lamblia, Entamoeba histolytica Cryptosporidium parvum, Cystoisospora belli, Cyclospora cayetanensis, Blastocystis hominis and Microsporidium spp* are the protozoan parasites involved in causing diarrhoea in patients with HIV/AIDS (Tables 1 and 3). HIV weakens the immune system and can contribute to opportunistic infections (OIs) that can cause several symptoms. For HIV/AIDS patients, identifying the cause of diarrhoea will help determine the best treatments for long-term management and better quality of life. Untreated diarrhoea is highly dangerous, dehydration or other life-threatening complications can result. With home remedies and changes in diets, diarrhoea may be handled.

Keywords: Diarrhoea, HIV/AIDS,Ntiretroviral, Cryptosporidiosis, Amoebiasis, Microsporidiosis.

Introduction.

In both developing and developed countries of the world, intestinal protozoa cause infections. Diarrhoea is caused by protozoal infection of the intestines (small and large). In developing nations, they are mainly responsible for the deaths of 3-4 million people annually (Farthing,2000; Farthing and Kelly,2005). *Giardia lamblia* and *Cryptosporidium parvum*, intestinal protozoa of the small intestine, are the key causes of diarrhoea in infants, contributing to the cycle of infection and malnutrition, leading to impaired growth and development. The Human Immunodeficiency Virus/HIV and theAcquired Immune Deficiency Syndrome/AIDS pandemic enhances the medical and clinical importance of intestinal protozoa. The discovery of other protozoan pathogens such as Microsporidia, Cyclospora and Cystoisospora has resulted in their medical relevance too.

Therefore, this article reviews some literature on parasitic diarrhoea in HIV/AIDS patients.

Table 1: Important Human Intestinal Protozoa

Phylum	Pathogenic Species	Non-Pathogenic Species
Sarcodina (Amoebae)	*Entamoeba histolytica*	*Entamoeba dispar*
		Entamoeba coli
	Entamoeba hartmani	
	Endolimax nana	
	Iodoamoeba butschlii	
Mastigophora (Flagellates)	*Giardia lamblia*	*Enteromonas hominis*
	Trichomonas vaginalis	
Ciliophora (Ciliates)	*Balantidium coli*	
Coccidia	*Cryptosporidium parvum*	
	Cystoisospora belli	
	Cyclospora cayetanensis	
	Sarcocystis spp	
Microsporidia	*Enterocytozoon bieneusi*	
	Encephalitozoon intestinalis	

Some important intestinal protozoan parasites are listed in Table 1.

One of HIV's most common manifestations is diarrhoea. Opportunistic and non-opportunistic organisms are the etiological agents. Opportunistic agents cause severe, chronic or frequent diarrhoea, while non-opportunistic organisms usually cause acute and treatable diarrhoea (Gupta et al., 2008). Diarrhoea is a very common HIV/AIDS complaint, but patients differ in their perception of what true diarrhoea is. It may be the passage of abnormal consistency of the stool, the urgency of defaecation, or an increased movement frequency (Miao and Gazzard, 2000). Chronic diarrhoea- a common symptom in patients with HIV/AIDS is the persistence of diarrhoea for more than four (4) weeks. They usually take over-the-counter drugs or local medications as a result of late diagnosis of HIV in some patients, which could give symptomatic relief while leaving the underlying disease untreated. This usually results in weight loss and waste syndrome in developing countries, such as Nigeria, culminating in elevated morbidity and mortality. Diarrhoea wasting syndrome plus a positive HIV serology test as an AIDS defining disease was defined by the World Health Organization (WHO) (WHO,2006).

The most frequent cause of diarrhoea in patients with HIV/AIDS is enteric protozoal infection.

Apoptosis, occasional crypt abscesses and much more severe villus atrophy are linked to diarrhoea caused by intestinal protozoa (Francis,1990). Bowel frequency is boosted by malabsorption and digestion.

Significance of Diarrhoea.

It has been estimated globally that every year there are 4 billion cases of acute diarrhoea. Every year, people in low-income parts of the world such as Africa, Latin America and the Indian Subcontinent may experience several episodes of diarrhea (Farthing,2000). Acute diarrhoea has a critical morbidity and mortality even in the rich parts of the globe. The economic implications of diarrhoea are relevant, but in poor countries they are more demanding. This is because diarrhoea management in these countries will put serious strain on those countries' healthcare budgets.

Table 2 below shows the group of individuals more susceptible to protozoan diarrhoea.

Table 2: Groups at High Risk of Diarrhoea.

Risk Factors	Groups at Risk
Age	- Infants
	-Young children
	- Elderly
Non-Immune Host Defense	- Elderly

Stomach acid	-Recipients of Acid inhibitory drugs
Immunodeficiency	-Congenital Immunodeficiency
	- HIV/AIDS
	- Cancer and Cancer chemotherapy
Antibiotics	- Recipients of Antibiotics
	- Elderly - Cancer patients

Source: Farthing,2000.

Infants, young children and the elderly are more susceptible to diarrhoea in Table 2. During the first few months of life, breast-fed infants are protected from gut infection. Because of the lost benefits of maternal milk, protection declines during weaning. However, as infant and pre-school children develop, acquired immunity to common intestinal pathogens increases, so that during adolescence and early adulthood, the age-specific prevalence of some intestinal pathogens also decreases. As a result of declining immune function, the elderly has enhanced susceptibility. It may also be due to a decline in the secretion of gastric acid.

Congenital and acquired immunodeficiency is regarded as a major diarrhoea risk factor. Protozoal infections such as giardiasis and cryptosporidiosis are associated with common variable immune deficiency. The role of cell immunity in the host defense against intestinal infection has been emphasized by HIV/AIDS; intracellular protozoa such as *C.parvum*, *Microsporidium spp,Cystoisospora belli* and *Cyclospora cayetanensis* predominate here. Opportunistic intestinal diarrhoea is associated with anticancer medications. In cancer patients, the use of broad-spectrum antibiotics is also blamed for antibiotic-associated diarrhoea.

Clinical Patterns of Diarrhoea

Acute watery diarrhoea, bloody diarrhoea and chronic diarrhoea are different types of diarrhoea.

Acute watery diarrhoea, which causes high dehydration, accounts for rapid fluid and electrolyte loss.

In general, bloody diarrhoea is caused by bacteria such as *Shigella spp*, *Salmonella spp* and *Campylobacter jejuni*.

Chronic diarrhoea may have different etiologies, but HIV-related diarrhoea could be caused by intracellular protozoa such as *C.parvum*, *Cyclospora cayetanensis, Microsporidium spp.*

Some examples of protozoa and bacterial agents of HIV-related diarrhoea are listed in Table 3.

Table 3. Shows Enteropathogens for HIV- Related Diarrhoea

Protozoa	*Cryptosporidium parvum*
Microsporidium spp	
Giardia lamblia	
Cystoisospora belli	
Cyclospora cayetanensis	
Bacteria	*Salmonella spp*
Shigella spp	
Campylobacter spp	
Vibrio parahaemolyticus	
Clostridium difficile	
Mycobacterium spp	

Source:Farthing,2000.

In HIV patients, numerous parasitic infections are known to cause diarrhoea. They include parasites previously described in uninfected patients with HIV as pathogens. A number of parasites, however, are now incriminated in diarrhoea, either newly discovered or previously thought not to have pathogenic potential. In Tables 1 and 3, these parasites are listed.

In healthy individuals - immunocompetent individuals - these organisms have also been identified as pathogens. Some studies have associated progressive immunosuppression with parasitic infections, while others have questioned this association. Diarrhoeal infections have been suggested to be aggregated in HIV-positive individuals regardless of CD4 counts (Feasy et al.,2011; Joseph and Ano-Edward,2016). Risk factors for parasitic exposure, particularly socio-economic status, adequate sanitation and access to drinking water, should therefore be considered when assessing HIV-positive patients with diarrhoea. HIV patients, like those who are not infected, are at risk of acute diarrhoea from bacterial enterocolitis agents. The risk of prolonged infection and invasive illness is higher for HIV patients. Table 3 lists examples of these diarrhoea causing bacteria.

More than any other infection in patients with HIV/AIDS, infections caused by intestinal parasites have been studied.

As the cause of diarrhoea, these infections have received particular attention.

In India, a study identified various diarrhoea-related pathogens in patients with HIV. *C. parvum*, had the highest frequency (33 percent) followed by *G. lamblia* (13.3 percent), Microsporidium

(6.7per cent), and *Cystoisospora belli* (2.7 percent). They reported that multiple parasitosis was statistically associated with chronic diarrhoea (Rossit et al.,2009).

Nevertheless, another study of HIV-positive adults with acute or chronic diarrhoea showed the prevalence of *E. histolytica* (14.9per cent) as the most common, Cryptosporidium (8.5per cent), *S.stercoralis* (5.3per cent) and *G. lamblia* (4.3per cent) (Joshi et al.,2002).

A study of HIV-positive adult African patients reported a variety of intestinal parasites in both diarrhoeic and non-diarrhoeic patients. The most common helminth was *Ascaris lumbricoides* (30.8 percent), *S. stercoralis* (5.1 percent). In this group, the non- diarrhoeic, the protozoa were *E. histolytica* (10.3 percent) and *G.lamblia* (3.8 per cent) (Rossit et al.,2009).

However, in diarrhoeic patients, Cryptosporidium, Microsporidium and *E. histolytica* were the most prevalent.

In their study conducted in Abeokuta, Nigeria, Amoo et al. (2018) recorded Cryptosporidium (22.5 percent), Microsporidium (3.0 percent). In the same way, from their analysis in Osun State, Joseph and Ano-Edward (2016) reported Cryptosporidium (33.6 percent), Cyclospora (20.8 percent), Cystoisospora (1.2 percent).

In Europe, a study of HIV-positive patients showed that the correlation between intestinal symptoms and immunosuppression was significant. The protozoa found in diarrhoeic patients were Cryptosporidium (21.5per cent), *Blastocystis hominis* (10.7per cent), Microsporidium (9.2per cent), *G.lamblia* (6.1 percent) and Cystoisospora (1.5 percent). In HIV/AIDS patients, there is a significant correlation between diarrhoea and cryptosporidiosis, giardiasis, cystoisosporiasis, microsporiasis, and amoebiasis.

Conclusion.

The immune system is weakened by HIV and can lead to opportunistic infections (OIs) that can cause many symptoms. Any of these symptoms, such as diarrhoea,can occur due to treatment-antiretroviral therapy. Protease inhibitors are the class with the highest risk of causing diarrhoea.

One of the most common complications of HIV is diarrhoea. It can be extreme or moderate, triggering loose stools or continuous stools sometimes (chronic).

Identifying the cause of diarrhoea will help decide the best therapies for long-term management and improved quality of life for HIV/AIDS patients.

Diarrhoea that is untreated is extremely harmful;dehydration or other life-threatening complications may result.

Another medicine should be prescribed to relieve diarrhoea if diarrhoea continues when taking antiretroviral drugs.

Diarrhoea can be treated with home remedies and improvements in lifestyles, such as:

- Drinking more clear liquids;
- Stop caffeine;

- Refrain from taking milk products;
- Eating 20 grams of soluble fibre or more per day;
- Avoiding greasy dishes and spices.

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