

Prevalence of Intestinal Parasites in Alcoholics

Akale Pallavi S.¹, Paranjpe Supriya M.², Koticha Avani H.³, Mehta Preeti R.⁴

¹Resident, Department of Microbiology, Seth G. S. Medical College and KEM Hospital, Mumbai, Maharashtra, India.

²Assistant Professor, Department of Microbiology, Seth G. S. Medical College and KEM Hospital, Mumbai, Maharashtra, India.

³Professor, Department of Microbiology, Seth G. S. Medical College and KEM Hospital, Mumbai, Maharashtra, India.

⁴Professor and HOD, Department of Microbiology, Seth G. S. Medical College and KEM Hospital, Mumbai, Maharashtra, India.

ABSTRACT

BACKGROUND

In developing countries both alcoholism and intestinal parasites are very common. Alcoholism and intestinal parasitic infections go hand in hand, not only due to their unhygienic conditions but also due to damage to immune system. The present study was aimed to find out the prevalence of intestinal parasites amongst alcoholics.

METHODS

300 alcoholics and non-alcoholics were tested for intestinal parasites. A single stool specimen was collected for detection of intestinal parasites. A saline and iodine mount was examined microscopically to demonstrate the intestinal parasites. Formol ether concentration technique was performed to increase the yield of the eggs and larvae. Water emergence technique and Agar plate culture was performed for *Strongyloides stercoralis*. Modified Acid Fast staining was done for opportunistic parasitic infections. The categorical outcomes were assessed by Chi Square test.

RESULTS

The prevalence of intestinal parasites was more in alcoholics (7.66%) as compared to non-alcoholics (3%). In alcoholics, among the helminths, *Strongyloides stercoralis* (2.6%) was predominantly seen followed by *Ascaris lumbricoides* (0.33%) and hookworm (0.33%). Amongst the protozoan parasites, the predominant parasite was *Entamoeba histolytica* (2.3%) followed by *Blastocystis hominis* (1.33%) and *Giardia lamblia* (0.6%). Prevalence of *Strongyloides stercoralis* had a significant correlation with history of walking barefoot. Eosinophilia was predominantly seen in alcoholics with intestinal parasites.

CONCLUSIONS

Alcoholics whether symptomatic or asymptomatic should be screened for intestinal parasites especially *Strongyloides stercoralis* to prevent morbidity. Presence of eosinophilia is a good positive predictive marker for intestinal parasitic infection. All alcoholics should be counselled regarding personal hygiene specially about barefoot walking to prevent infection with *Strongyloides stercoralis*.

KEY WORDS

Alcoholism, Intestinal Parasites, *Strongyloides stercoralis*, Eosinophilia

Corresponding Author:
Dr. Supriya Paranjpe,
Department of Microbiology,
5th Floor, MSB, Seth G. S. Medical College,
KEM Hospital, Mumbai, Maharashtra,
India.
E-mail: supriyamparanjpe@gmail.com

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BACKGROUND

Intestinal parasites are virtually present worldwide. Ascariasis, amoebiasis, hookworm infection and trichuriasis are amongst the ten most common infections throughout the world.⁽¹⁾ The prevalence of intestinal parasites ranges from 2.5% to 91% in developing countries.^(2,3,4,5,6) In developing countries both alcoholism and intestinal parasites are very common. Alcoholism and intestinal parasitic infections go hand in hand, not only due to their unhygienic conditions but also due to damage to immune system.⁽⁷⁾ Ethanol reduces inflammatory cells as well as alters cytokines leading to prolonged survival of intestinal parasites.^(7,8) Immunosuppressive conditions like HIV and HTLV infection, prolonged use of steroids, alcoholism and cytotoxic drugs can accelerate autoinfectious cycle and can cause overwhelming replication of the parasite progressing to hyperinfection or dissemination.^(7,9,10) Multiple case studies are published regarding alcoholism being the risk factor for *Strongyloides stercoralis* infection.^(10,11) However, as per Schar et al, the prevalence of *Strongyloides stercoralis* amongst alcoholics appears to be underestimated.⁽⁹⁾ The reason proposed being low sensitive diagnostic test used for detection of *Strongyloides stercoralis*.⁽⁹⁾

The present study was conducted to determine the prevalence of intestinal parasites amongst alcoholics with special reference to *Strongyloides stercoralis* and to correlate presence of intestinal parasites with factors like age, clinical manifestations, socioeconomic status and presence of eosinophilia.

METHODS

A cross-sectional study was conducted in a tertiary care multispecialty teaching hospital in Mumbai, India after obtaining institutional ethics committee permission. The sample size was calculated based on prevalence of 26% from study conducted by Schar et al⁽⁹⁾ by which, with 5% precision, 300 each of the alcoholics (cases) and non-alcoholics (Controls) were recruited in the study. Alcoholics were defined as per the Diagnostic and Statistical Manual of Mental Disorders (DSM) 5 criteria⁽¹²⁾ diagnosed by qualified psychiatrist and non-alcoholics were considered as person who do not drink alcohol at all or social drinking of maximum of 1 event per week.

After obtaining an informed written consent, the clinical as well as demographic history was taken as per the case record form. A single stool specimen was collected for detection of parasitic infection in a clean, wide mouth, leak-proof screw capped container. A saline and Iodine mount was prepared and examined microscopically to demonstrate helminthic eggs, motility of protozoan trophozoites and larvae of *Strongyloides stercoralis*. Saline and Formol ether Concentration technique was performed to increase the yield of the eggs and larvae.

Water emergence technique and Agar plate culture was performed for *Strongyloides stercoralis*.⁽¹³⁾ Modified Acid-Fast staining was done for opportunistic parasitic infections.⁽¹⁴⁾

Statistical Analysis

The difference between proportions of two groups was analysed by using Chi-square test. The statistical software SPSS Ver.16 was used to perform the analysis.

RESULTS

In the present study, the age of study participants ranged from 21 to 50 years with a mean age of 40.3 years. (Table 1) There was a positive correlation between eosinophilia and presence of intestinal parasites. (P value= 0.001) (Table 1) There was a significant correlation between lower middle-class economic status and presence of intestinal parasites. (P value= 0.0067) (Table 1) The prevalence of intestinal parasites was significantly more in alcoholics (7.66%) as compared to non-alcoholics (3%). (P value= 0.01) (Table 2) In alcoholics, among the helminths, *Strongyloides stercoralis* (2.6%) was predominantly seen followed by *Ascaris lumbricoides* (0.33%) and hookworm (0.33%). Amongst the protozoan parasites, the predominant parasite was *Entamoeba histolytica* (2.3%) followed by *Blastocystis hominis* (1.33%) and *Giardia lamblia* (0.6%). (Table 3) There was a significant correlation between symptoms and presence of intestinal parasites (p value = 0.0000001) (Table 4) *Strongyloides stercoralis* was detected in 5 (12.20%) out of 41 alcoholics who gave history of walking barefoot which was statistically significant. (p value = 0.002) (Table 5).

	Intestinal Parasites Detected	Intestinal Parasites not Detected	Total	p Value
Age (Years)				
21-30	8 (12.1%)	58 (87.9%)	66	0.3
31-40	6 (5.8%)	98 (94.2%)	104	
41-50	9 (6.9%)	121 (93.1%)	130	
Socioeconomic Status (Kuppuswamy Class)				
Lower middle class	13 (13.83%)	81 (86.17%)	94	0.0067
Upper middle class	10 (4.85%)	196 (95.15%)	206	
Eosinophil Count				
Normal	12 (4.16%)	277 (95.84%)	289	0.001
Raised	11 (100%)	0 (0%)	11	

Table 1. Correlation of Age, Socioeconomic Status, Eosinophilia & Intestinal Parasites in Alcoholics

	Intestinal Parasites Detected	Intestinal Parasites not Detected	Total	p Value
Alcoholics	23 (7.66%)	277 (92.34%)	300	0.01
Non-Alcoholics	9 (3%)	291 (97%)	300	

Table 2. Prevalence of Intestinal Parasites in Alcoholics and Non-Alcoholics

	Intestinal Parasites Detected	Alcoholics (n=300)	Non- Alcoholics (n=300)	p Value
Helminths	<i>Strongyloides stercoralis</i>	8 (2.67%)	0 (0%)	0.0075
	Hookworm	1 (0.33%)	0 (0%)	1
	<i>Ascaris lumbricoides</i>	1 (0.33%)	0 (0%)	1
	<i>Hymenolepis nana</i>	0 (0%)	1 (0.33%)	1
Protozoa	<i>Entamoeba histolytica</i>	7 (2.33%)	3 (1%)	0.20
	<i>Blastocystis hominis</i>	4 (1.33%)	2 (0.67%)	0.41
	<i>Giardia lamblia</i>	2 (0.67%)	3 (1%)	0.65
Total		23 (7.66%)	9 (3%)	0.01

Table 3. Distribution of Intestinal Parasites in Alcoholics and Non-Alcoholics

	Intestinal Parasites Detected	Intestinal Parasites not Detected	Total	p Value
Symptomatic	13 (54.17%)	11 (45.83%)	24	0.0000001
Asymptomatic	10 (3.62%)	266 (96.38%)	276	
Total	23 (7.66%)	277 (92.34%)	300	

Table 4. Correlation of Clinical Manifestations and Intestinal Parasites in Alcoholics

History of Walking Barefoot	<i>Strongyloides stercoralis</i> Detected	<i>Strongyloides stercoralis</i> Not Detected	Total	p Value
Barefoot walker	5 (12.20%)	36 (87.80%)	41	0.002
Non-barefoot walkers	3 (1.16%)	256 (98.84)	259	
Total	8 (2.66%)	292 (97.34%)	300	

Table 5. Correlation of Barefoot Walking and *Strongyloides stercoralis* in Alcoholics

DISCUSSION

Alcohol consumption, especially heavy drinking, is an important risk factor for many health problems and thus, is a major contributor to the global burden of diseases.⁽¹⁵⁾ Infections are more frequent and severe amongst the alcoholics probably due to dulled mental function, breakdown of local protective barriers, aspiration, exposure to pathogens and malnutrition.⁽¹⁶⁾ Immunosuppressive conditions like HIV, HTLV infection, prolonged steroid use, alcoholism and cytotoxic drugs⁽¹⁷⁾ can accelerate autoinfection and cause an overwhelming replication of parasite progressing to hyperinfection or dissemination which can be fatal. Early detection of the presence of these larvae in the stool specimen will prevent spread of these larvae to the lungs and further complications.

In the present study the prevalence of intestinal parasites was more in the age group of 21-30 years, as compared to other age groups. But there was no significant predilection of any age group to intestinal parasite in both groups. (Table 1) A similar finding was reported in the study by Gomes et al.⁽⁷⁾ There was a high prevalence of intestinal parasites in low socioeconomic areas. (Table 1) Dhanabal et al have reported a similar finding from south Chennai.⁽¹⁸⁾ It is expected that people from low socioeconomic status have lesser access to clean water supply and sanitary facilities. Also, lack of education and awareness regarding hygienic practices may be responsible for higher prevalence of intestinal parasites in this group. Intestinal parasites were detected in all patients with eosinophilia which was statistically significant. (Table 1) Many studies have evaluated the importance of presence of eosinophilia in diagnosis of *Strongyloides stercoralis*. Loutfey MR et al have suggested that eosinophilia can be used as a potential useful marker for the diagnosis of the infection.⁽¹⁹⁾ Sanchez et al and Gill et al have reported presence of eosinophilia as the only indicator of *Strongyloides stercoralis* infection. This highlights the fact that the presence of eosinophilia should indicate stool screening for intestinal parasites to prevent the further morbidity in already morbid alcoholic patients. In the present study the prevalence of intestinal parasites in alcoholics (7.6%) was significantly higher as compared to the non-alcoholic group (3%). (Table 2) Gomes et al⁽⁷⁾ and Avendano et al have also reported a high prevalence of intestinal parasitism in alcoholics.⁽²⁰⁾ There was a high prevalence of *Strongyloides stercoralis* (2.66%) in alcoholic group as against absence of *Strongyloides stercoralis* in non-alcoholic group (Table 3). High prevalence of *Strongyloides stercoralis* infection in alcoholics may be due to higher predisposition to infections due to poor hygiene conditions like walking barefoot, evacuation in their clothes or lack of hygiene following the evacuation.

Another reason could be breakdown of immune defences to eliminate the parasites which could occur at the level of intestinal mucosa, the cell mediated and/ humoral immunity or the compliment system.⁽³⁰⁾ Various studies have similarly, reported a higher frequency of *Strongyloides stercoralis* in alcoholics as compared to non-alcoholics.^(7,20,21) Adedayo et al reported 27 cases of hyperinfection and found that 44% of the patients had a history of chronic alcoholism which was a relevant factor associated with poor prognosis of *Strongyloides stercoralis* infection.⁽²²⁾ Silva et al conducted a study in HIV/AIDS patients and observed that out of the infected patients who reported to be chronic alcoholics, 64.3% had strongyloidiasis.⁽²³⁾ Kuyare et al have also reported the presence of alcoholism as a risk factor in 56% of patients with strongyloidiasis.⁽²⁴⁾

Out of the total 7.6% of intestinal parasites detected in alcoholics in the present study, protozoans predominated (4.3%) followed by 3.3% helminths. (Table 3) There was no significant difference between the prevalence of intestinal parasites other than *Strongyloides stercoralis* in alcoholic and non-alcoholic group. Similar finding was reported by Gomes et al.⁽⁷⁾ In the present study, the prevalence of *Entamoeba histolytica* in alcoholics was 2.3% which was more as compared to non-alcoholics (1%) (Table 3) *Entamoeba histolytica* is the third leading cause of parasite related deaths in the world.⁽²⁵⁾ The spectrum of diseases caused by this protozoan includes intestinal as well as extra intestinal manifestations mostly in the form of amoebic liver abscess.⁽²⁶⁾ Chronic alcoholism seems to predispose to amoebic liver abscess as seen by the fact that most amoebic liver abscess cases occur in people who consume regular alcohol.^(27,28,29,30) In the past experimental studies have shown that iron acts as growth factor for *Entamoeba histolytica*.^(31,32) It is known that alcohol influences the absorption of iron⁽³³⁾ and the metabolic effects of chronic alcohol consumption include an increase in the liver iron content, thus potentiating the growth of *Entamoeba histolytica* in the liver.⁽³⁴⁾ It has been reported that, 10% of the world's population are infected with *Entamoeba* species in which pathogenic *Entamoeba histolytica* constitute only 10% of these infections and the remaining 90% are infected by non-pathogenic *Entamoeba dispar*.⁽³⁵⁾ Routine microscopy cannot differentiate between pathogenic *Entamoeba histolytica* and non-pathogenic *Entamoeba dispar*. Molecular analysis is needed to differentiate between the two. Hence, careful history taking, and clinical correlation is required if *Entamoeba histolytica* or *Entamoeba dispar* is detected in the specimen and needs to be treated accordingly.

There is a strong correlation between prevalence of *Blastocystis hominis* and presence of irritable bowel syndrome.⁽³⁶⁾ Also, *Blastocystis hominis* is associated with malabsorption syndrome⁽³⁷⁾ which can lead to increase in morbidity of alcoholics. Though the prevalence of *Blastocystis hominis* in alcoholics was 1.3% which was not statistically different from non-alcoholics. The alcoholics with *Blastocystis hominis* infection should be followed up for the signs and symptoms of irritable bowel.

In the present study, the prevalence of *Ascaris lumbricoides* was reported to be 0.33% in alcoholics as against absence of *Ascaris lumbricoides* in non-alcoholic group. (Table 3) *Ascaris lumbricoides* can cause malnutrition by consumption of nutrients which are needed by the host; interference with intestinal absorption due to mucosal damage by the parasite;

it can cause protein energy malnutrition and night blindness due to vitamin A deficiency.⁽³⁷⁾ The presence and extent of protein calorie malnutrition play an important role in determining the outcome of patients with alcoholic liver disease. Mortality increases in direct proportion to the extent of malnutrition, approaching 80% in patients with severe malnutrition.⁽³⁸⁾ Micronutrient abnormalities, such as hepatic vitamin A depletion or depressed vitamin E levels, may also potentially aggravate liver disease.⁽³⁹⁾ Hence the treatment of alcoholics with *Ascaris lumbricoides* should be done to prevent further complications.

Hookworm infection is usually acquired by walking barefoot on fecally contaminated soil or by accidentally drinking water contaminated with filariform larvae.⁽³⁷⁾ Schmidin et al have shown a positive correlation between outdoor defecation and prevalence of soil transmitted helminths.⁽⁴⁰⁾ The adult worms inhabit the small intestine, attaching themselves to the mucous membrane of the intestine. In a course of time, a severe progressive anaemia of microcytic hypochromic type develops.⁽³⁷⁾ Alcohol has various adverse effects on the types of blood cells and their functions such as generalized suppression of production of blood cell, production of structurally abnormal blood cell precursors that cannot mature into functional cells and defective red blood cells that are destroyed prematurely, possibly resulting in anaemia.⁽⁴¹⁾ Even though the prevalence of hookworm was low in the study, to prevent the aggravation of anaemia it can be recommended that the alcoholics needs to be screened for hookworm infection and treated for the same.

In the present study there was a significant correlation between the symptoms and presence of intestinal parasites. (Table 4) In a retrospective study conducted by Kuyare et al, it was reported that the commonest complaint in *Strongyloides stercoralis* infection was diarrhoea followed by breathlessness, whereas one fifth of patients were asymptomatic.⁽²⁴⁾ In a study conducted in an adult population Becker et al reported the following symptoms in patients infected with *Strongyloides stercoralis*: 40.5% complained of abdominal pain, 18.9% had diarrhoea, 32.4% passed blood in stool, 27% had cough, 16.2% had skin rashes and 16.2% had pruritis.⁽⁴²⁾

As the mode of infection of Strongyloidiasis is penetration of intact skin, we evaluated barefoot walking and frequency of *Strongyloides stercoralis*. In the present study, *Strongyloides stercoralis* was detected in 5 (12.20%) out of 41 alcoholics who gave the history of walking barefoot. (Table 5) One alcoholic patient with hookworm infection also gave history of walking barefoot.

In a study conducted in Nepal, Sah et al observed that regular wearing of sandals or shoes had a significantly lower prevalence of parasitic infections i.e. 3.2% as compared to those who did not wear sandals or shoes which was 26.2%.⁽⁴³⁾ Similarly, in a study conducted by Cremades et al 30 of the 37 positive cases for *Strongyloides stercoralis* (81%) had history of walking barefoot.⁽⁴⁴⁾ Shcmidiin et al have also noted a positive correlation between walking barefoot and prevalence of *Strongyloides stercoralis* and hookworm.⁽⁴⁰⁾ This suggests that the alcoholics should be counselled about their personal hygiene including, avoiding walking barefoot to prevent infections with soil transmitted helminths like *Strongyloides stercoralis*.

CONCLUSIONS

All alcoholics whether symptomatic or asymptomatic should be screened for intestinal parasites especially *Strongyloides stercoralis* to prevent morbidity. Presence of eosinophilia is a good positive predictive marker for intestinal parasitic infection. All the alcoholics should be counselled regarding personal hygiene, specially about barefoot walking to prevent infection with *Strongyloides stercoralis*.

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