

## Intestinal Parasites in the Diabetic Patient

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### Abstract

**Objective:** To evaluate the risk of intestinal parasite infection in diabetic patients compared to healthy people.

**MATERIALS AND METHODS:** This is a prospective case-type study including 50 healthy consultant patients and 50 diabetic patients at the Avicenna Military Hospital of Marrakech. The study takes place within the Department of Parasitology - Mycology of the Avicenna Military Hospital of Marrakech in collaboration with the endocrinology department of the same hospital. The study subjects are divided into two groups, one group includes patients with DS who were randomly selected from those followed for diabetes registered and one control group selected and matched with the DS Group for age and sex, the duration of study is two months from 01/06/2018 to 01/09/2018. Three samples are included and obtained from patients after the complete explanation of the process for them and then collected at the parasitology laboratory. For each coprological sample, we performed a parasitological examination of the stool in the fresh state and after Lugol staining. A concentration by Baileger technique and a Ziehl-Neelsen stain modified with a centrifugation pellet was carried out.

**Results:** The study group consisted of 50 diabetic patients (24 men and 26 women) and 50 control subjects (28 men and 22 women) who were not affected. Parasite infection rate was significantly higher in patients with DM 48% than in controls 10% ( $P < 0.001$ ). The distribution of risk factors in the two groups wasn't different. In our study, the most frequently found species was *Blastocystis hominis* (21 cases), followed by *Entamoeba histolytica/Dispar* (2cas) and *Entamoeba coli* (2cases). Only the level of *Blastocystis hominis* was significantly different between the two groups 42% for DM and 4% for control patients with  $P < 0.050$ . Infection with two species was observed in a single patient with DM who had *Entamoeba coli* and *Blastocystis hominis*.

**Conclusion:** Diabetic patients are at greater risk of developing parasitic infections than the normal population, and *Blastocystis hominis* is specifically an important opportunist in the gastrointestinal tract responsible for parasitic infections in diabetic patients.

### Introduction

Intestinal parasites continue to cause significant morbidity and mortality in developing countries, especially the immunocompromised, and are now considered a major health problem worldwide.

Diabetes mellitus is a chronic condition due to either a genetic or acquired insufficiency of insulin production by the pancreas, or to the fact that this insulin is not active enough. [1] Recently, it has been shown that both innate and acquired immunities are altered in DS. Due to the general immunosuppressive conditions during diabetes mellitus, a high prevalence of various infections is expected in diabetics [2,3], but surprisingly, epidemiological data in this regard are scarce and there are few studies on the prevalence of intestinal parasitosis in diabetic patients

**Materials and methods**

This is a prospective case-type study including 50 healthy consultant patients and 50 diabetic patients at the Avicenna military hospital of Marrakech. The study takes place within the Department of Parasitology - Mycology of the Avicenna military hospital of Marrakech in collaboration with the endocrinology department of the same hospital.

The study subjects are divided into two groups, one group includes patients with DS who were randomly selected from those followed for diabetes registered and one control group selected and matched with the DS Group for age and sex, the duration of study is two months from 01/06/2018 to 01/09/2018. Samples included three samples obtained from patients after the complete explanation of the process for them and then collected at the parasitology laboratory.

For each coprological sample, we performed a parasitological examination of the stool in the fresh state and after Lugol staining. A concentration by Ballenger technique and a Ziehl-Neelsen stain modified with a centrifugation pellet was carried out.

**Results:**

The study group consisted of 50 diabetic patients (24 men and 26 women) and 50 control subjects (28 men and 22 women) not affected

the mean age of the DS group is 55 years with extremes ranging from 25 to 9 years, sex was not a risk factor for the acquisition of intestinal parasites in patients with diabetes.

In the case of risk factors related to diabetes, there was an increase in the number of patients with dyslipidemia and hypertension compared with the control group, overweight and obesity were quite common in both groups.

Education level, occupation, and water source were not significantly associated with intestinal parasitic infections ( $p = 0.126$ ,  $p = 0.095$ ,  $p = 0.260$ ) (table: 1)

There was no association between the duration and type of diabetes, with the risk of intestinal parasitic infections and duration of diabetes mellitus ( $p = 0.321$ ,  $p = 0.250$ )

For the risk factors related to diabetes, there was an increase in the number of patients with dyslipidemia and hypertension compared to the control group; overweight and obesity were quite common in both groups.

Table 1: Risk Factors for Parasite Infection in Both DS Groups and Control

Risk factor/group	DS (%)	Control (%)
Average age (years)	55	52
socio-economic level		

Way Low	43 (86%) 7 (14%)	40 (80%) 10 (20%)
Level of education: Primary Secondary illiterate	10(20%) 5(10%) 35(70%)	4 (8%) 20 (40%) 26 (52%)
geographic origin ( water source) : Urban Rural	43 (86%) 7 (14%)	40 (80%) 10 (20%)
body mass index : (18.5-25) (25-30) (30-35)	19 (38%) 15( 30%) 16 (32%)	14(28%) 10 (20%) 26 (52%)

Parasite infection rate was significantly higher in patients with DM 48% than in controls 10% (P <0.001).

In our study, the most common species found was Blastocystis hominis (21 cases), followed by Entamoeba histolytica/Dispar (2cases) and Entamoeba coli (2cases) (Table 2).

Only the level of Blastocystis hominis was significantly different between the two groups 42% for DM and 4% for control patients with P <0.050.

Infection with two species were observed in a single patient with DM who had Entamoeba coli and Blastocystis hominis

**Table 2:** Different species responsible for parasitic infection

Pathogen / group	DS	Control
Blastocystis hominis	21	2
Entamoeba coli	3	2
Entamoeba histolytica/Dispar	2	1
Ecoli+BH	1	0

E.coli (Entamoeba coli ), BH (Blastocystis hominis)

## DISCUSSION

Protozoa and helminths are among the most important pathogens that can cause infections in immunocompromised people, diabetic patients are immunocompromised in whom the

prevalence of intestinal parasitic infections are increased in recent years, but there is not enough study that is interested in assessing the risk of intestinal parasite infection in diabetic patients.

This study showed that the risk of infection with intestinal parasites was 4.8 times higher in patients with diabetes mellitus than in healthy people, This is in line with a previous study conducted in two cities close to Tehran (Karaj and Savojbolagh) in Iran, where the rate of intestinal parasitic infections in diabetic patients was higher than that of healthy controls (5.6% vs. 10%) [4].

In Egypt, patients with diabetes mellitus were examined among other immunocompromised groups and a high risk of parasite infection was found among them [5,6].

We found that the rates of pathogen and opportunistic infections as well as commensal factors were not different between the two groups, with the exception of *B. hominis* which was significantly higher with diabetes mellitus.

Although many doubts remain about the pathogenic role of BH in humans, it is now accepted as a potential pathogen that can specifically disrupt an immunocompromised host. [7]

In our study, 50% of patients with BH had diarrhea, which is a result and similar to those found in the literature [8], [9].

Studies on intestinal parasitic infections show that different parasites are the main infectious agents; however, *Blastocystis* has almost always been among the most common parasites in immunocompromised patients [10]

Age and sex were not risk factors for the acquisition of intestinal parasites in patients with diabetes in our study, so in Iran, no study showed a significant difference related to these two parameters [ 11,12]

The level of education, occupation and water source did not have a significant impact on the prevalence of intestinal parasitic infections in patients with diabetes this is in perfect agreement with the literature [13]

Dyslipidemia and hypertension are risk factors often related to diabetes and not an effect on the rate of parasitic infection

For the overweight and obesity that have been quite common in both groups this is explained by the lifestyle and diet of Moroccans

## **CONCLUSION**

Diabetic patients are at greater risk of developing parasitic infection than the normal population, from which it is found that *Blastocystis hominis* is specifically an important opportunist of the gastrointestinal tract responsible for parasitic infections in diabetic subjects.

## **Reference**

- Stark D, Barratt JLN, van Hal S, Marriott D, Harkness J, Ellis JT. Clinical significance of enteric protozoa in the immunosuppressed human population. *Clin Microbiol Rev* 2009; 22(4): 634-50.
- Brink AK, Mahe C, Watera C, Lugada E, Gilks C, Whitworth J, et al. Diarrhea, CD4 counts and enteric infections in a community-based cohort of HIV-infected adults in Uganda. *J Infect* 2002; 45(2): 99-106.

- Hunter PR, Nichols G. Epidemiology and clinical features of Cryptosporidium infection in immunocompromised patients. *Clin Microbiol Rev* 2002; 15(1): 145-54.
- Akhlaghi L, Gharavi M, Faghihi A, Jabbari M. Survey on the prevalence rates of intestinal parasites in diabetic patients in Karaj and Savodjbolagh cities. *Razi j Med Sci* 2005; 12(45): 23-9. [In Persian].
- Baiomy AM, Mohamed KA, Ghannam MA, Shahat SA, Al-Saadawy AS. Opportunistic parasitic infections among immunocompromised Egyptian patients. *J Egypt Soc Parasitol* 2010; 40(3): 797-808.
- Belmokhtar F, Belmokhtar R, Dali-Sahi M, et al. Risk factors associated with type 2 diabetes mellitus in west region of Algeria, Maghnia. *J Diabetes Metab.* 2011;2:148e150.
- Batista MV, Pierrotti LC, Abdala E, Clemente WT, Girao ES, Rosa DR, et al. Endemic and opportunistic infections in Brazilian solid organ transplant recipients. *Trop Med Int Health* 2011; 16(9): 1134-42. Available from: <http://dx.doi.org/10.1111/j.1365-3156.2011.02816.x>
- Gassama A, Sow PS, Fall F, Camara P, Gueye- N'diaye A, Seng R, et al. Ordinary and opportunistic enteropathogens associated with diarrhea in Senegalese adults in relation to human immunodeficiency virus serostatus. *Int J Infect Dis* 2001; 5(4): 192-
- Marcos LA, Gotuzzo E. Intestinal protozoan infections in the immunocompromised host. *Curr Opin Infect Dis* 2013; 26(4): 295-301. Available from: <http://dx.doi.org/10.1097/QCO.0b013e3283630be3>
- Adamu H, Wegayehu T, Petros B. High prevalence of diarrhoeagenic intestinal parasite infections among non-ART HIV patients in Fitcha Hospital, Ethiopia. *PLoS One* 2013; 8(8): e72634. Available from: <http://dx.doi.org/10.1371/journal.pone.0072634>
- Paboriboune P, Phoumindr N, Borel Sourinphoumy K, Phaxayaseng S, Luangkhot E, et al. Intestinal parasitic infections in HIV-infected patients, Lao People's Democratic Republic. *PLoS One* 2014; 9(3): e91452. Available from: <http://dx.doi.org/10.1371/journal.pone.0091452>
- Sayyari AA, Imanzadeh F, Bagheri Yazdi SA, Karami H, Yaghoobi M. Prevalence of intestinal parasitic infections in the Islamic Republic of Iran. *East Mediterr Health J* 2005; 11(3): 377-83.
- Arani AS, Alaghebandan R, Akhlaghi L, Shahi M, Lari AR. Prevalence of intestinal parasites in a population in south of Tehran, Iran. *Rev Inst Med Trop Sao Paulo* 2008; 50(3): 145-9.