

Comparative Study of Intestinal Parasites Isolated and Identified from Type-2 Diabetic and Non-Diabetic Population Reporting to Arif Memorial Hospital, Lahore

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ABSTRACT

Introduction: Diabetes consists of a collection of metabolic disorders in which a person has increased glucose levels in blood, mainly due to two reasons. Either the body does not secrete adequate insulin or the cells do not show any kind of response to the produced insulin. So study was done to compare the prevalence of intestinal parasites in type 2 diabetes mellitus patients with non-diabetic people of the same age and gender and to compare the prevalence of different intestinal parasites within the cases and the controls.

Material and Methods: A total of n=110 (55 cases and 55 controls) were taken for study. Stool samples were collected from each participant in properly labelled, clean, wide mouthed container. Fresh stool samples were processed using the formol ether concentration technique and was examined microscopically for ova/ cysts. Eosin and Methylene blue staining was performed for the RBC's and WBC's determination.

Results: Out of 110 patients, 56.3% were females and 43.6% were males in each study group with male to female ratio of 2:1. 39% subjects were in age group of 41-50 years, 36.3% in 51-60 years, 16.3% were in 30-40 years of age group and only 8.1% were in 61-70 years age group. The mean age of all 110 selected patients was 48.9±8.2 years with minimum observed age of 30-32 years and maximum age of 65-68 years. Out of the 55 cases, n=52 (94.5%) had one or more intestinal parasite in their stool sample with most common type *Entamoeba histolytica*(n=40). while from out of n=55 controls, n=43 (78.2%) had intestinal parasite with most common type *Entamoeba histolytica* (n= 32). This shows that intestinal parasite were 13.6% greater in diabetic cases as compare to non-diabetic. The difference of intestinal parasite was statistically significant among the two study groups (P= 0.02).

Conclusion: There is strong association of intestinal parasite infection in diabetic patients. The presence of intestinal parasites may pose hazardous effects to diabetic patients and therefore its risk should be considered.

Keywords: Intestinal, Parasite, Protozoa, Diabetes.

INTRODUCTION

Diabetes is one of the most common chronic illnesses worldwide and it continues to increase in number and significance because of modified lifestyles lead to lessened physical activity, and increased obesity. Based on the data by WHO (2010), approximately 220 million people are suffering from diabetes globally, 80% diabetics belong from the countries which are developing and each year 5% of deaths occur due to diabetes. The number of people in

Pakistan suffering from diabetes was 5,217,000 in 2000 and it is projected to rise to 13,853,000 by 2030 (WHO Eastern Mediterranean Region, 2010)¹. The Pakistan National Diabetes Survey in 2010 published a paper regarding the prevalence of diabetes and it was reported 12.14% in males and 9.83% in females. Intestinal parasitic infections are found to be the most notorious and alleged co-morbidities associated with diabetes mellitus.

The prevalence of diabetes mellitus (DM) and impaired glucose tolerance (IGT) is increasing at alarming rate in Pakistan that has become a chilling threat to the overall healthcare system². The risk ratio of acquisition of different types of infection including intestinal infections in diabetic versus non-diabetic people was found to be 1:21, especially for serious bacterial infections³.

Diabetic patients are more likely to get parasitic infections as compared to the non-diabetic subjects primarily due to immune dysregulation, age, metabolic control and long term complications. Intestinal parasites normally reside in the gastro-intestinal portion in humans and other animals. They can live everywhere in the body, but most parasites prefer to live on the intestinal wall. There are different means of exposure to parasitic infections including ingestion of undercooked meat, drinking contaminated water, and skin absorption.

Some common intestinal protozoan parasites includes *Giardia Intestinalis*, *Entamoeba histolytica*, *Cyclospora cayetanensis* and *Cryptosporidium* spp. The disorders caused by these intestinal protozoan parasites are collectively known as giardiasis, amoebiasis, cyclosporiasis and cryptosporidiosis respectively and almost all of these diseases are associated with diarrhea⁴.

Due to an extensive variety of intestinal parasites, a description of the symptoms is not sufficient for a diagnosis. Instead, two common diagnostic tests are used: stool samples need to be collected to search for the presence of parasites

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and the application of an adhesive at the anus in order to search a parasites' eggs⁵.

Overall predominance of intestinal parasites was 18.7% in diabetic patients. Diabetes mellitus status was very much associated with intestinal parasitic infections.

Unfortunately, in spite of such a frightening increase of parasitic infections among diabetic patients, no research specifically to note the scenario has yet been conducted in Pakistan.

Diabetic patients typically suffer from numerous complications due to abnormal metabolic activities and immune dysregulation. The presence of intestinal parasitic infections further aggravates the suffering of diabetic patients and late diagnosis and mismanagement of such infections may result in serious outcomes. Nevertheless, as such there exists no report for prevalence of intestinal parasitic infections in diabetic patients of Pakistan. With this background in mind, the present study was carried out to evaluate the prevalence of intestinal parasitic infections among diabetic and non-diabetic patients.

MATERIAL AND METHODS

It was a Case control study conducted in Arif Memorial Hospital, Lahore in six months. A total of n=110 (55;case and 55;control) individuals were taken for study. Patients of type -2 diabetes mellitus of either gender having age more than or equal to 30 years were included in this study. Cases and controls that were not willing to participate, taking any medications and suffering from other chronic disorders or infections were excluded. The requirements of the consent were fulfilled. The stool samples were collected in properly labelled, clean, wide mouthed sterile plastic containers. The physical examination of stool samples was done for colour, smell, blood, mucus and any worm segments. Fresh stool was processed using the formol ether concentration technique and was examined microscopically for presence of ova and/or cysts. Iodine stain was also used for better microscopic vision. Eosine and Methylene blue stain was used for detection of RBC's and WBC's. All data was recorded properly on prescribed proforma as soon as the samples were collected.

STATISTICAL ANALYSIS

The study protocol was planned and followed on the rules set by the ethical committee. The data was analyzed using SPSS version 20. Chi-square test was applied to see association of Intestinal parasites in both cases and controls and p-value<0.05 was considered as significant.

RESULTS

A total of n=110 subjects were taken for study. Out of 110 subjects, n=55 were cases and n=55 were control. Out of 110 subjects, n=31 (56.3%) were females and n=24 (43.6%) were males in each study group with male to female ratio of 2:1. 39% were in age group of 41-50 years, 36.3% in 51-60 years. 16.3% were in 30-40 years of age group and 8.1% were in 61-70 years age group. The mean age of all 110 selected patients was 48.9±8.2 years with minimum

Type	Case	Control	Total
Entamoeba histolytica	40	32	72
Taenia species	23	13	36
Ancylostoma duodenale	19	13	32
Hymenolepis nana	16	13	29
Giardia lamblia	11	15	26
Diphyllobothrium latum	2	9	11
Ascaris lumbricoides	2	4	6
Trichuris trichiura	1	1	2
Entrobium vermicularis	0	2	2

Note: Entamoeba histolytica most common type.

Table I: Comparison of different types of intestinal parasites in both study groups.

observed age of 30-32 years and maximum age of 65-68 years. Among cases, n= 22(40%) subjects were in age group of 51-60 years, n=20 (36%) in 41-50 years, n=7 (12%) in 30-40 years of age group and n=7 (10%) were in 61-70 years age group. Among controls, n= 23 (41%) subjects were in age group of 41-50 years, n=18 (32%) in 51-60 years, n=11 (20%) in 30-40 years of age group and n=3 (5%) were in 61-70 years age group.

Out of 110 subjects, 68% patients were taking healthy but unbalanced diet, 19% subjects were taking both unhealthy and unbalanced diet. While only 12.73% patients were having both healthy and balanced diet in their life. Among cases n=16 (29%) patients had unbalanced and unhealthy diet as compared to controls (n=5; 9.1%). The diet of n=31(56.4%) cases was healthy but unbalanced as compared to controls (n=44; 80%) and in only n=8 (14%) cases, it was healthy and balanced. Statistically there was significant difference of type of food among the two study groups (p= 0.016). Among all subjects (n=110) history of deworming was found in only 7.27% patients and in 92.73% no history of deworming was found. Out of n=55, 0% cases were dewormed, while n= 8 (14%) controls had history of deworming.

Distribution of subjects according to their toilet used was done also. 94.55% subjects used flush type, 3.64% did not had access to sanitary means and while remaining percentage used pit latrines. Among cases, 7.3% compared to 0% controls had inavailability of sanitary facilities as compared to controls (0%). While 90.9% cases compared to 98% controls had flush system as compared to controls (98%). Abdominal pain or distention observed in 76.36% subjects (n=43 cases; n=41 controls), nausea and vomiting in 12.7% (n=9 cases; n=5 controls) and complain of fever was found in only 5.45% subjects (n=2 cases; n=4 controls). On stool examination, out of total n= 110 subjects intestinal parasites were seen to be present in n=95 (86.36%) subjects. Out of the 55 cases, n=52 (94.5%) had one or more intestinal parasite in their stool sample with most common type Entameoba histolytica which was found in n=40 cases, while from out of 55 controls, n=43 (78.2%) had intestinal parasite with most common type Entameoba histolytica in n= 32 cases (Table I).

Present study shows that the chances of intestinal parasite infection is 13.6% greater in diabetic cases as compare to

non-diabetics. The difference of intestinal parasite was found statistically significant among the two study groups ($P=0.02$).

DISCUSSION

Diabetes mellitus is a common chronic disease in which a person has high blood glucose, either because the body does not produce enough insulin, or cells do not respond to the insulin that is produced⁶. This disorder not only poses serious danger to patient's quality of life and health, but also causes various life threatening co-morbidities. The prevalence of diabetes mellitus is high and rapidly increasing in developing countries especially in Asia including Pakistan⁷.

In the present study, we compared the prevalence of intestinal parasites in type 2 diabetes mellitus (cases) with non-diabetic people (controls) of the same age and gender and also compared the prevalence of different intestinal parasites isolated and identified within the cases and the controls. A total of 110 subjects (55 cases and 55 controls) were collected and assessed in this study. The mean age of all 110 selected patients was 48.9 ± 8.2 years with minimum observed age of 30-32 years and maximum age of 65-68 years. Out of 110 subjects, majority were females (56.3%) as compared to males in each study group with male to female ratio of 2:1. Tangi FB et al (2016) also mentioned the same findings in his study⁸.

As far as the diet was concerned, among cases most of the them ($n=16$; 29%) had unbalanced and unhealthy diet as compared to controls ($n=5$; 9.1%). Statistically significant difference of type of food among the two study groups was found ($p=0.016$). These findings are similar to the findings of Frederico F et al (2013)⁹.

Akinbo et al. (2013) mentioned in his study that type of toilet significantly ($p=0.0001$) affects the prevalence of different intestinal parasitic infections in diabetic patients. In our study, among cases, 7.3% had inavailability of sanitary facilities as compared to controls (0%) and were found to parasites in their stool sample⁶.

On stool examination, out of total $n=110$ subjects intestinal parasites were found in 86.36% subjects. Out of the 55 cases, 94.5% had one or more intestinal parasite in their stool sample with most common type *Entamoeba histolytica* which was found in $n=40$ cases, while *Trichuris trichiura* was found to be the least common type (2%). Out of 55 controls, 78.2% had intestinal parasite with most common type *Entamoeba histolytica* in $n=32$ cases and *Trichuris trichiura* was the least common type (2%). Tangi FB et al (2016) studied the prevalence of intestinal parasitic infection in diabetic patients and found *Entamoeba histolytica* the most common type which is similar to the present study but he found hookworm the least common type which is in contrast to our study. However, further studies are required to confirm this finding⁸.

CONCLUSION

The prevalence of intestinal parasitic infection is 13.6% greater in diabetics as compared to non-diabetics and is more

frequent in females. Most common parasite isolated from stool samples was *Entamoeba histolytica*. The results of our study showed that there was association of intestinal parasitic infections in diabetic patients. The presence of intestinal parasites may pose hazardous effect on the health of diabetic patients and therefore its risk should be considered. Our data is primary; more research work in our country is needed planned to confirm our results.

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