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Distribution of intestinal parasites in two societies with different socio-economic status in Van*

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Objective The purpose of this study was to evaluate the effect of socio-economic status on the distribution of intestinal parasites.

Method A comparative study was applied to see the difference in the distribution of intestinal parasites. For this purpose, 268 immigrants representing low socio-economic group and 205 university residents representing high socio-economic group were included in the investigation. Stool samples were examined by native-lugol, iron-hematoxylin staining and flotation methods.

Results One or more intestinal parasites in 149 (55.6%) out of 268 immigrants, and 55 (27.3%) out of 205 university residents were detected.

Conclusion The finding of this study suggests that socio-economic status is an important factor on the distribution of intestinal parasites

Key words Intestinal parasites, socio-economic status

Introduction

Intestinal parasitosis is one of the most important sicknesses in developing countries. Several factors such as temperature, humidity, intermediate host, socio-economic status of society, customary nutrition of people, immigration etc. play role in the distribution of intestinal parasites. Economic problems, immigrations, wars etc. may affect water reservoir, food and hand hygiene, so contamination by the parasite through fecal-oral route may increase (1-8).

In the present study, role of socio-economic status on the distribution of intestinal parasites was investigated. The study was conducted on two groups of people living in close neighborhood but having different socio-economic status.

Material and Method

The present study was conducted by the departments of Microbiology and Clinical Microbiology and Public Health of Medical School, Yüzüncü Yıl University.

The study is a cross-sectional study which has analytical and epidemiological features. This study was conducted on two groups of people; the first group was immigrants who had migrated from Hakkari to Van province and had been located nearby the Campus of Yüzüncü Yıl University. Immigrants were named as Immigrant group (IG) who had low socio-economic status. The second group was the university lecturers and their families who had been living in the university accommodations approximately for 15 years. This group was named as Resident group (RG) who had high socio-economic status. A temporary parasitology laboratory was set from RG (total: 473 persons), whose ages were between 0-80 years, were examined.

The stool samples were examined by native-lugol, iron-hematoxylin staining and flotation (in saturated saline solution) methods. The stool samples which were brought to the laboratory were first examined for the presence of protozoa by native-lugol method. Then, the samples were examined for the presence of helminths by flotation (in saline solution) at the Parasitology Laboratory of School of Medicine, Yüzüncü Yıl University. Second and/or third stool samples were examined in those who had especially intestinal complaints but with undetectable parasites in the first stool samples. When required, some of the samples were stained by iron-hematoxylin and examined. In the present study, cellophane tape preparation (CTP) technique couldn't be performed.

Results

In this study, stool samples of 473 persons were examined. One or more parasites in 149 (55.6%) out of 268 persons from the IG and in 55 (27.3%) out of 205 persons from the RG were determined. The difference was statistically significant (χ^2=40.17; p<0.001). The numbers and percentages of the parasites were given in Table I.

In the study, *Entamoeba histolytica* was found in the IG and the RG as 11.6% and 5.9% (χ^2=8.50; p=0.004), respectively. *Giardia intestinalis* was found in the IG and the RG as 14.2% and 5.9% (χ^2=39.96; p=0.004), respectively, whereas *Ascaris lumbricoides* was found in the IG and the RG as 24.6% and 3.4% (χ^2=39.96; p<0.001), respectively. Endolimax nana, *Hookworm*, *Strongyloides stercoralis*, *Trichuris trichiura*, *Enterobius vermicularis*, *Taenia saginata* and *Hymenolepis nana* was only found in IG (Tables I, II, III).

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Table I. Comparison of the parasites in the IG and the RG

Parasites	The IG (n=268); Total,	%	The RG (n=205); Total,	%
E.histolytica*	31	11.6	12	5.9
E.coli	42	15.7	22	10.7
E.nana	1	0.4	-	-
B.hominis	25	9.3	18	8.8
G.intestinalis**	38	14.2	12	5.9
C.mesnili	3	1.1	1	0.5
S.stercoralis	1	0.4	-	-
Hookworm	1	0.4	-	-
A.lumbricoides***	66	24.6	7	3.4
T.trichiura	19	7.1	-	-
E.vermicularis	3	1.1	-	-
T.saginata	2	0.8	-	-
H.nana	3	1.1	-	-

*($\chi^2 = 8.50$, $p = 0.004$); **($\chi^2 = 8.50$, $p = 0.004$); ***($\chi^2 = 39.96$, $p<0.001$)

Table II. Distribution of the parasite groups in the IG

Groups of Parasites	Total
E.histolytica + E.coli	4
E.histolytica + E.nana	1
E.histolytica + B.hominis	3
E.histolytica + G.intestinalis	4
E.histolytica + A.lumbricoides	2
E.histolytica + T.trichiura	2
E.histolytica + H.nana	1
E.coli + B.hominis	3
E.coli + G.intestinalis	2
E.coli + C.mesnili	1
E.coli + A.lumbricoides	5
B.hominis + G.intestinalis	1
B.hominis + A.lumbricoides	2
B.hominis + E.vermicularis	1
G.intestinalis + A.lumbricoides	5
G.intestinalis + T.trichiura	1
G.intestinalis + E.vermicularis	1
G.intestinalis + H.nana	1
A.lumbricoides + T.trichiura	7
A.lumbricoides + E.vermicularis	1
Hookworm + T.saginata	1
E.histolytica + E.coli + B.hominis	2
E.histolytica + E.coli + C.mesnili	1
E.histolytica + E.coli + S.stercoralis	1
E.histolytica + G.intestinalis + A.lumbricdes	1
E.histolytica + A.lumbricoides + T.trichiura	2
E.coli + B.hominis + A.lumbricoides	2
E.coli + G.intestinalis + B.hominis	1
E.coli + G.intestinalis + T.trichiura	1
E.coli + A.lumbricoides + T.trichiura	2
E.coli + A.lumbricoides + H.nana	1
G.intestinalis + B.hominis + A.lumbricoides	1
E.histolytica+ E.coli + G.intestinalis + B.hominis	1
E.histolytica+E.coli+G.intestinalis+A.lumbricoides	1
E.coli+ B.hominis+ A.lumbricoides+ T.trichiura	1
Total	67

Table III. Distribution of the parasite groups in the RG

Groups of Parasites	Total
E.histolytica + E.coli	1
E.histolytica + B.hominis	2
E.histolytica + G.intestinalis	2
E.histolytica + A.lumbricoides	1
E.coli + B.hominis	3
E.coli + A.lumbricoides	1
B.hominis + G.intestinalis	3
G.intestinalis + A.lumbricoides	1
E.histolytica + E.coli + G.intestinalis	1
E.coli + G.intestinalis + C.mesnili	1
Total	16

As seen in tables II and III, the rate of mixed infections in IG was quite high compared with that of RG.

Discussion

Several workers studied the distribution of intestinal parasites in Turkey but the results found weren't always similar (9-18).

In the present study, the rate of intestinal parasitosis was 55.6% in the IG and 27.6% in the RG. The rate of parasitosis which we found in RG was lower than the average values in other studies performed in various areas of Turkey (9-18). The mean rate of parasitosis in IG was higher than the mean rates of the same studies.

The first study on the distribution of intestinal parasites was conducted on primary school children at Saray village of Özalp town in Van by Çalışkan (19). The rate of intestinal parasites was 63.7%. Later, Değer et al.(20) found the rate of intestinal parasites in the primary school children in Van center as 62.7%. Our recent studies revealed the rates of intestinal parasites in children aged between 0-13 (21) and over 14 (22) as 22.2% and 26.1%,

respectively. The result from IG demonstrated similarity to those found by Çalışkan and Değer et al. and the results shown in RG is consistent with the findings of our recent studies (21,22). The reason for high prevalence found by Çalışkan (19) and Değer et al.(20) is that their stool samples were taken from people who live in an area which has low socio-economic status.

Several workers have also demonstrated various percentage of many parasite species in the different locations of Turkey (7,9,11,13-15,18,19,21-23).

In our study, the prevalence rates of *A.lumbricoides* and *E.histolytica* in IG were higher than the mean rates of other studies performed in Turkey, however these rates in RG were close to the mean rates reported in Turkey. In the same way, the prevalence rates of other parasitoses found in IG were above the mean rates, but the rates found in RG took place under the mean rates reported in Turkey. In the present study, rates of *E.vermicularis* were under our estimate in both groups because CTP technique couldn't be performed.

Van province has a low temperature and long winter season. Although these factors have a limiting effect on the parasites to be spread out, low socio-economic status and some other environmental factors have an important impact on the high prevalence and rich flora of parasites in this province.

In the study, percentages of intestinal parasites in RG observed were also high. The reason for this outcome could be the contamination of drinking water with sewage because sewage system is not sufficient in Van center. Another reason for this could be that the people in the IG were living in close neighborhood with people in the RG. Most of the people in the IG defecate in open areas which may also increase the spread of parasites in the RG who live close to the IG. This means that being a member of a society which has a high socio-economic status and being well educated is not sufficient enough, together these infrastructure of sewage system and drinking water reservoirs has also an important effect on the distribution of intestinal parasites. It is known that contamination risk of drinking water in the University campus area with feces is a weak possibility because of the presence of a good sewage system. However, contamination of drinking water is a strong possibility, for the water comes from Van center.

It has been well documented that people in low socio-economic status has high rates of intestinal parasites (3-6,8,14-16,18,19). Similarly, in the present study the rates of intestinal parasites in RG which had high socio-economic status was lower compared to IG who had low socio-economic status.

In this study, the rates of intestinal parasites were higher in IG, together with the number of different parasite species. In 67 (44.97%) out of 149 persons from IG and in 16 (29.09%) out of 55 persons from RG had two or more parasites in their stool samples (Table II, III).

Hookworm, S.stercoralis, T.trichiura, E.vermicularis, T.saginata, H.nana and *E.nana* weren't found in RG. *A.lumbricoides* was seen lower in RG than IG (χ^2=39.96; p<0.001).

In conclusion, the present study showed that differences in the socio-economic status has important effect on the distribution of intestinal parasites. The persons in the IG were mainly uneducated, living overcrowded and had low socio-economic status. On the other hand, people in the RG were mainly university lecturers and their families who had better socio-economic status were well educated. All these factors are important for the results found in this study.

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