

A Comprehensive Retrospective Study: Intestinal Parasites in Human in Van Province

Geniş Kapsamlı Bir Retrospektif Çalışma: Van Yöresinde İnsanlarda İntestinal Parazitler

✉ Zeynep Taş Cengiz¹, ✉ Hasan Yılmaz¹, ✉ Yunus Emre Beyhan¹, ✉ Mutalip Çiçek²

¹Yüzüncü Yıl University Faculty of Medicine, Department of Parasitology, Van, Turkey

²Ahi Evran University Faculty of Medicine, Department of Parasitology, Kırşehir, Turkey

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ABSTRACT

Objective: The aim of present study was to retrospectively determine the prevalence of intestinal parasites in patients, who were referred to Parasitology Laboratory in Van Yüzüncü Yıl University, Faculty of Medicine during an 11-year period.

Methods: Stool samples of 69633 individuals admitted to the outpatient clinics in the hospital were initially evaluated with native-Lugol, and then by flotation, sedimentation, trichrome staining, modified acid-fast staining and ELISA methods.

Results: Twenty-four parasite species were identified in parasite-positive patients. At least one or more parasite species were found in 34.1% of all patients. The most commonly observed parasite was *Blastocystis hominis* (26.5%). Among pathogen parasites, *Giardia intestinalis* (*G. intestinalis*) was detected in 9.3%, *Ascaris lumbricoides* (*A. lumbricoides*) was detected in 2.5%, *Entamoeba histolytica/Entamoeba dispar* in 0.8%, *Cystoisospora belli* in 0.004%, *Fasciola hepatica* in 0.04%, *Dicrocoelium dendriticum* in 0.001%, *Strongyloides stercoralis* in 0.001% and hookworm in 0.001% of the patients.

Conclusion: It was determined that, pathogen parasites such as *G. intestinalis* and *A. lumbricoides* were still observed at high rates in Van province, especially in children, and the problem of parasitosis is still continuing, although the prevalence of parasites has declined when compared to the previous years.

Keywords: Intestinal parasites, human, Van

ÖZ

Amaç: Bu çalışmanın amacı 11 yıllık bir süreçte Van Yüzüncü Yıl Üniversitesi Tıp Fakültesi Parazitoloji Laboratuvar'ına başvuran hastalarda intestinal parazitlerin prevalansını retrospektif olarak belirlemektir.

Yöntemler: Hastanemizin polikliniklerine başvuran 69633 hastanın dışkı örnekleri nativ-Lugol ayrıca gerek duyulduğunda flotasyon, sedimantasyon, trikrom ve modifiye asit-fast boyama ve ELISA metodu ile değerlendirilmiştir.

Bulgular: Pozitif bulunan hastalarda toplam 24 parazit türü saptanmıştır. En az bir ya da daha fazla parazit türü bütün hastaların %34,1'inde belirlenmiştir. En sık saptanan parazit, *Blastocystis hominis* olmuştur. Patojen parazitlerden *Giardia intestinalis* (*G. intestinalis*) %9,3, *Ascaris lumbricoides* (*A. lumbricoides*) %2,5, *Entamoeba histolytica/Entamoeba dispar* %0,8, *Cystoisospora belli* %0,004, *Fasciola hepatica* %0,04, *Dicrocoelium dendriticum* %0,001, *Strongyloides stercoralis* %0,001 ve çengelli solucanlar %0,001 oranında saptanmıştır.

Sonuç: Parazitlerin yayılış oranı geçmiş yıllara göre bir düşüş göstermiş olsa da özellikle çocuk yaş grubunda *G. intestinalis* ve *A. lumbricoides* gibi patojen parazitlerin Van yöresinde hala yüksek oranda görüldüğü ve parazitöz probleminin hala devam ettiği anlaşılmıştır.

Anahtar Kelimeler: İntestinal parazitler, insan, Van



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Address for Correspondence/Yazar Adresi: Zeynep Taş Cengiz MD, Yüzüncü Yıl University Faculty of Medicine, Department of Parasitology, Van, Turkey

Phone/Tel: +90 530 510 44 46 E-mail/E-Posta: ztas72@yahoo.com ORCID ID: orcid.org/0000-0002-5247-5644

INTRODUCTION

Intestinal parasites are frequently observed in socio-economically underdeveloped or developing countries. The reasons for high parasitosis incidence include ecological factors such as abundant intermediate or reservoir hosts, shared habitat use or sharing nutrients and insufficiency in settlement infrastructure. Intestinal parasites are encountered more frequently among children when compared to adults, and may cause significant growth defects in children (1-4).

The prevalence of intestinal parasites varies among different regions in Turkey. The parasites are more frequently observed in socio-economically low regions such as Eastern and Southeastern Anatolia due to inadequate infrastructure, construction, defecation in open fields because of inadequate bathroom especially in rural areas, too many irrigation channels and the consumption of raw or undercooked watercress (5-8).

The aim of present study was to retrospectively determine the prevalence of intestinal parasites in patients, who were referred to Parasitology Laboratory in Van Yüzüncü Yıl University, Faculty of Medicine during an 11-year period.

METHODS

The population of Van was 979.671 in 2007, literacy rate was 74.6%, and the rate of university graduates was 6.4% (2000 general population census). Gross national product per capita and urbanization rate were below Turkey's average. However, the population growth rate was above Turkey's average (9).

For the present study, the ethic committee approval report was obtained from Yüzüncü Yıl University, Faculty of Medicine, Non-Interventional Clinical Research Ethics Committee (date: February 27, 2014; decision number: 03). The results of the stool samples examined in Parasitology Laboratory in Van Yüzüncü Yıl University, Faculty of Medicine, located at Van, Turkey, between 1997 and 2007 were evaluated retrospectively. The study samples included 69633 individuals (32033 female and 37600 male), who were admitted to the outpatient clinics in the hospital, and they

were initially examined with native-Lugol, and then by flotation, sedimentation, trichrome staining, modified acid-fast staining and ELISA methods (10). For *Entamoeba histolytica/Entamoeba dispar*, the stool samples were stained by trichrome staining method and analyzed with ELISA [r-biopharm; RIDASCREEN® *Entamoeba* (C 1701)] method for the antigen. The patients diagnosed with *Fasciola hepatica* (*F. hepatica*) or *Dicrocoelium dendriticum* (*D. dendriticum*) eggs were asked if they had eaten a dish containing liver during the week before the examination. After warning the patients, not to eat such food in order to prevent false positive results, the stool samples were examined on three successive days. After this step, ELISA method (DRG Diagnostics; *F. hepatica* IgG ELISA) was used to analyze the results of *F. hepatica* positive patients.

Comparisons of the pathogen parasites' prevalence for age groups and gender were analyzed by independent two proportions Z (t) test. The statistical significance level was considered as 5% ($p < 0.05$) (MINITAB; ver: 14).

RESULTS

In the present study, at least one or more parasite species were detected in 23729 (34.1%) out of 69633 individuals. Parasite species were detected in 33.9% out of 32033 female and in 34.2% out of 37600 male individuals. There were no significant differences between the prevalence of total parasitosis based on gender or age variables (Table 1). One species of parasite was determined in 24.6%, two species were determined in 5.7%, three species were determined in 1%, 4 species of parasites were determined in 0.3% of all patients. Prevalence of certain pathogen parasites by years are presented in Figure 1. Prevalence of the parasites were as follows: *Blastocystis hominis* (*B. hominis*) 26.5%, *Giardia intestinalis* (*G. intestinalis*) 9.3%, *Entamoeba coli* 6%, *Ascaris lumbricoides* (*A. lumbricoides*) 2.5%, *Hymenolepis nana* (*H. nana*) 1.2%, *Iodamoeba butschlii* 1.6%, *Chilomastix mesnili* 1.1%, *E. histolytica/E. dispar* 0.8%, *Cryptosporidium* spp. 0.7%, *Entamoeba hartmanni* 0.7%, *Enterobius vermicularis* 0.6% (in the stool), *Endolimax nana* 0.4%, *Trichuris trichiura* (*T. trichiura*) 0.3%,

Table 1. Prevalence of parasite species by age groups and gender and statistical analysis results

Parasite species	Total (N= 69633)		≤0-13 years old (N= 39600)		≥14 years old and older (N= 30033)		p values	♂ (N= 37600)		♀ (N= 32033)		p values
	n	%	n	%	n	%		n	%	n	%	
<i>E. histolytica/E.dispar</i>	589	0.8	292	0.7	297	1	<0.01	317	0.8	272	0.8	>0.05
<i>Giardia intestinalis</i>	6504	9.3	4910	12.4	1594	5.3	<0.01	3701	9.8	2803	8.8	<0.01
<i>Blastocystis hominis</i>	18460	26.5	13340	33.7	5120	17	<0.01	5488	14.6	12972	40.5	<0.01
<i>Cryptosporidium</i> spp.*	92	0.7	92	0.7	-	-	-	48	0.6	44	0.7	>0.05
<i>Ascaris lumbricoides</i>	1720	2.5	994	2.5	726	2.4	>0.05	909	2.4	811	2.5	>0.05
<i>Trichuris trichiura</i>	241	0.3	119	0.3	122	0.4	<0.05	126	0.3	115	0.4	>0.05
<i>Hymenolepis nana</i>	859	1.2	676	1.7	183	0.6	<0.01	522	1.4	337	1.1	<0.01
<i>Taenia saginata</i>	153	0.2	24	0.1	129	0.4	<0.01	63	0.2	90	0.3	<0.01
<i>Fasciola hepatica</i>	25	0.04	8	0.02	17	0.1	<0.05	2	0.01	23	0.1	<0.01
Patients with parasite	23729	34.1	13400	33.8	10329	34.4	>0.05	12864	34.2	10865	33.9	>0.05

N: Total number of patients, n: Total number of patients with parasite; *The parasite was only investigated in 0-13 years old children and between 2004-2007 years (N= 13847; Male= 7575; Female= 6272)

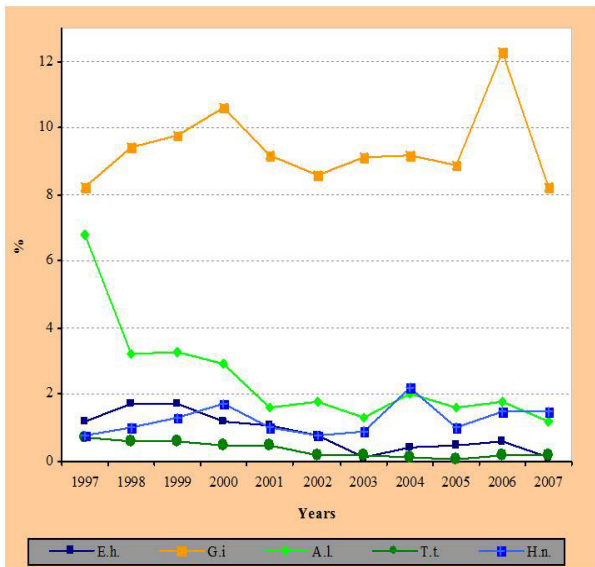


Figure 1. Prevalence of certain pathogen parasites by years (Abbreviations, E.h.: *Entamoeba histolytica/E. dispar*, G.i.: *Giardia intestinalis*, A.l.: *Ascaris lumbricoides*, T.t.: *Trichuris trichiura*, H.n.: *Hymenolepis nana*)

Taenia saginata (*T. saginata*) 0.2%, *Enteromonas hominis* 0.1%, *Trichomonas hominis* 0.07%, *F. hepatica* 0.04%, *Retortamonas intestinalis* 0.02%, *Dientamoeba fragilis* 0.009%, *Cystoisospora belli* (*C. belli*) 0.004%, *Strongyloides stercoralis* 0.001%, *D. dendriticum* 0.001%, hookworm 0.001% and *Trichostrongylidae* spp. 0.001%.

No statistically significant difference was found between the frequency of parasites based on age and gender groups. The difference between the frequency of *E. histolytica/E. dispar* ($p < 0.01$), *G. intestinalis* ($p < 0.01$), *B. hominis* ($p < 0.01$), *T. trichiura* ($p < 0.01$), *H. nana* ($p < 0.01$), *T. saginata* ($p < 0.01$) and *F. hepatica* ($p < 0.05$) was statistically significant based on the age groups. The difference between the frequency of *G. intestinalis*, *B. hominis*, *H. nana*, *T. saginata* and *F. hepatica* was statistically significant based on gender ($p < 0.01$; Table 1).

DISCUSSION

The prevalence of intestinal parasites depends on environmental and socioeconomic factors. These parasites are prevalent in underdeveloped agricultural and rural areas in tropical and subtropical regions (11,12).

The socio-economic status and education level in eastern sections of East Anatolia Region, Turkey is notably low. Our hospital in Van province, which is located in this region, serves a large patient population. In previous studies conducted in Van province, it was reported that the rate of intestinal parasitosis was between 22.2-77.4% (6,8,13,14). The present study findings suggested lower rates (34.1%) when compared to the results of certain previous studies conducted in Van province (6,8).

The prevalence of intestinal parasites varies based on the region in Turkey. These parasites are less common (3.6-24.1%) in western Turkey due to better socio-economic standards and educational levels (15-18). In previous studies conducted in eastern provinces in Turkey, the rate of intestinal parasitosis was reported as 17-

63.3% (19-22). In previously conducted studies in Erciş district in Van province, parasitosis rate was determined as 77.4% (0-13 age group) and 77.1% (all age groups). In both studies, it was determined that *A. lumbricoides* was the most common parasite (respectively, 48.1% and 49%) and the prevalence of *F. hepatica* was 0.6% and 2.4% (6,8). In the present study, it was found that the intestinal parasitosis rate was 34.1% and the most frequently determined pathogen parasite was *G. intestinalis* (9.3%).

B. hominis, whose pathogenicity is still controversial, was identified as the most prevalent parasite (26.5%) in the present study. It was observed that the prevalence of this parasite was between 0.05-13.1% in certain previous studies, which was lower when compared to the findings of the present study (6,8,13,16-18).

E. histolytica/E. dispar affects 10.2% of the world population (11). The prevalence of this parasite was reported to be below 12% in Van province (13,14). In the present study, it was found that the prevalence of *E. histolytica/E. dispar* was as low as 0.8% (by age group, $p < 0.01$). Giardiasis has a worldwide distribution. It is one of the ten most common intestinal parasites observed in humans (11,12). In Van province, the highest rate for this parasite was determined as 21.3% in under 13 age group in 1998 (6). In the current study, the prevalence was found as 12.4% in under 13 age group (by age and gender, $p < 0.01$), and 9.3% in general population.

Literature review demonstrated that previously reported *C. belli* cases in Turkey included renal transplant, congenital diserythropoiesis, AIDS and bronchoalveolar carcinoma patients (23,24). In our hospital, *C. belli* was diagnosed in three patients (0.004%); one immunosuppressed and two immunocompetent patients.

Previously, *A. lumbricoides* was identified in 7.81-49.03% of the population in previous studies conducted in Van province (6,8,13,14). The parasite was detected in 2.5% of the sample in our study, and this rate was very low when compared to previous studies conducted in Van province. *F. hepatica* was more prevalent with a rate of 2.4% in a previous study and lower rates were reported in other studies (0.02-0.1%) (6,14,25). In the current study, the prevalence of this parasite was determined as 0.04%.

In our region, the prevalence of important pathogenic parasites was usually below 2% between 1997 and 2007. However, the spread rate of *G. intestinalis* was never below 8% until 2007 (Figure 1).

CONCLUSION

In conclusion, it was determined that, pathogen parasites such as *G. intestinalis* and *A. lumbricoides* were still observed at high rates in Van province, especially in children, and the problem of parasitosis is still continuing, although the prevalence of the parasite declined when compared to the previous years.

* Ethics

Ethics Committee Approval: The study was approved by Yüzüncü Yıl University Medical Faculty Non-Interventional Clinical Researches Ethics Committee.

Informed Consent: Retrospective study.

Peer Review: Externally and internally peer-reviewed.

* Authorship Contributions

Concept: Z.T.C., Design: Z.T.C., H.Y., Y.E.B., Data Collection or Processing: Z.T.C., H.Y., M.Ç., Analysis or Interpretation: Z.T.C., H.Y., Y.E.B., Literature Search: Z.T.C., Y.E.B., Writing: Z.T.C., H.Y., Y.E.B.

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