

## Distribution of Intestinal Parasites for Age and Gender in the 13 to 18 Years Age Group at the Niğde Orphanage

Birol ÖZKALP \*  Battal ÇELİK \* Muhammet Güzel KURTOĞLU \*\* Recep KEŞLİ \*\*

\* Department of Medicinal Laboratory, Vocational School of Health Services of Selçuk University, TR-42031 Konya - TURKEY

\*\* Konya Educational and Research Hospital, Microbiology and Clinical Microbiology Laboratory, TR-42031 Konya - TURKEY

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### Summary

The present study was aimed at the determination of the rate of infection with intestinal parasites in children cared for at the Niğde Orphanage, and the demonstration of the distribution of infection in these children for age and gender. Faecal samples collected from 110 children, aged 13 to 18 years, were examined by the native method using physiological saline. Of the 110 faecal samples examined, 41 (37.3%) contained intestinal parasites, and of the samples containing parasites, 25 (61%) contained helminths and 16 (39%) contained protozoa. The number of faecal samples identified to contain a single parasite species was 39 (95%), while 2 (5%) samples contained more than one parasite species. As regards the distribution of the intestinal parasites for gender, it was ascertained that of the 75 females 30 (40%) individuals and of the 35 males 11 (31.5%) individuals were infected with intestinal parasites. The difference between the two sexes was considered to be insignificant. Faecal examination revealed the presence of the following parasite species at the indicated rates: *Ascaris lumbricoides* (34.1%), *Entamoeba histolytica* (29.3%), *Taenia saginata* (17.1%), *Giardia intestinalis* (9.8%), *Enterobius vermicularis* (7.3%) *Trichuris trichiura* (2.4%). The present study demonstrated that the environment of the orphanage was favourable for autoinfection and the spread of infection by direct contact. Furthermore, it was determined that the rate of parasitic infection was higher in the age group of 13 to 14 years, compared to the age group of 15 to 18 years.

**Keywords:** *Intestinal parasites, Children, Orphanage, Niğde*

## Niğde Yetiştirme Yurdunda 13-18 Yaş Grubunda Görülen Barsak Parazitlerinin Yaşa ve Cinsiyete Göre Dağılımı

### Özet

Bu çalışmada yurt çocuklarında barsak parazitlerinin yol açtığı enfeksiyon oranlarının ve bu oranların çocuklarda yaş ve cinsiyete göre dağılımın belirlenmesi amaçlanmıştır. Niğde Yetiştirme Yurdunda yaşları 13-18 arasında değişen 110 çocuktan alınan dışkı örnekleri, serum fizyolojik (nativ - salin) yöntemi kullanılarak incelenmiştir. İncelenen 110 dışkı örneğinden 41'inde (%37.3) barsak parazitleri belirlenmiş, bunlardan 25'inin (%61) helmint, 16'sının (%39) protozoon olduğu görülmüştür. Tek tür parazit görülenler 39 (%95), birden çok parazit görülen 2 (% 5) olarak tespit edilmiştir. Parazit görülenlerin cinsiyet dağılımı, 75 kızdan 30'unda (%40), 35 erkekte ise 11(%31.5), olmuştur. Cinsiyetler arasındaki fark, önemsiz olarak kabul edilmiştir. Parazit türleri ise sırasıyla; *Ascaris lumbricoides* (%34.1), *Entamoeba histolytica* (%29.3), *Taenia saginata* (%17.1), *Giardia intestinalis* (%9.8) *Enterobius vermicularis* (%7.3) *Trichuris trichiura* (%2.4)olarak belirlenmiştir. Bu çalışma ile yaşanan yurt ortamının oto-enfeksiyon ve direkt temasla bulaşmaya elverişli olup parazitlenmenin 13-14 yaş grubunda, 15-18 yaş grubuna oranla daha fazla olduğu tespit edilmiştir.

**Anahtar sözcükler:** *Barsak parazitleri, Çocuk, Yetiştirme yurdu, Niğde*



İletişim (Correspondence)



+90 332 2231064



ozkalpbirol@hotmail.com

## INTRODUCTION

Various factors, including the temperate climate of the country, unfavourable environmental conditions, inadequate sanitary services and education, and insanitation result in predisposition to the establishment and spread of intestinal parasites <sup>1</sup>.

In humans, infection with intestinal parasites is a major phenomenon in regions characterized by unfavourable nutritional and climatic conditions, where hygiene is poor and the socioeconomic level is low <sup>2-6</sup>. Furthermore, inadequate sanitation and health checks in environments of collective residence or education, such as student dormitories, lead to the spread of infection <sup>7-11</sup>.

Parasitic infections of the gastrointestinal tract are very common across the world, and gastrointestinal parasites are reported as major causes of morbidity and mortality <sup>12,13</sup>.

Intestinal parasitosis, which still constitute a major problem in developing countries, are known to cause physical and mental retardation, difficulty in adaptation to the environment, insomnia, fatigue, anaemia and psychological disorders in children <sup>14</sup>.

The prevalence of intestinal parasites in a community is a phenomenon closely related to public health, and which is considered to be an indicator of the development level of the community <sup>15</sup>. Parasitic diseases have a significant share in the causes of death in children under the age of five throughout the year across the world. Similarly, in Turkey, intestinal parasites are a major health problem, and it is reported by various researchers that intestinal parasitosis are very common in nurseries, infant schools and schools, where children reside collectively <sup>16-18</sup>.

In a multitude of studies conducted in different regions of Turkey, the prevalence (proportion of number of individuals in a population having disease) and incidence (number of new cases of a disease occurring during a certain time period) of parasitic infections, and thereby, the significance of these infections, have been demonstrated <sup>19-25</sup>.

The present study was aimed at the determination of the rate of infection with intestinal parasites in certain age groups in children cared for at the Niğde Orphanage, and the demonstration of the distribution of the determined infection rates for age and gender.

## MATERIAL and METHODS

Faecal samples collected from 110 children, cared for

at the Niğde Orphanage, constituted the material of the study. The age and gender of the children were recorded on the container of each faecal sample. For the collection of faecal samples, sterile, capped containers, which were identified with numbers, were given to the children. The samples collected were transferred to the laboratory for examination. The samples were subjected to both macroscopic and microscopic examination. For this purpose, after native examination using Lugol's solution, the formol-ethyl acetate concentration technique was applied. The specimens prepared for native examination with Lugol's solution were examined with standard light microscopy under x40 magnification, while the specimens prepared for the formol-ethyl acetate concentration technique were examined with standard light microscopy under x10 magnification. Faecal samples were recorded as positive when one or more parasites were observed with light microscopy under x40 magnification <sup>26,27</sup>.

For the detection of *E. vermicularis*, the children were applied the cellophane tape method, and the slides were examined with standard light microscopy under x10 magnification. Another method used for diagnosis was the preparation of faecal smears and their staining with trichrome. These smears, which were stained with permanent stains, were examined with standard light microscopy under x100 magnification <sup>27</sup>. Statistical analyses were performed using the Pearson chi-square test.

## RESULTS

Of the 110 faecal samples examined with the native method using Lugol's solution, 41 (37.4%) contained intestinal parasites. Of the 41 intestinal parasites detected, 25 (61%) were identified as helminths and 16 (39%) were identified to be protozoa. Two students were concurrently infected with two helminth species. The results of faecal examination and distribution for gender are given in [Table 1](#), while the results for the distribution of the parasite species identified are presented in [Table 2](#). The distribution of children diagnosed with intestinal parasites for gender is given in [Table 3](#), and the

**Table 1.** The results of faecal examination and distribution for gender

**Tablo 1.** Dışkı incelemesi sonuçları ve cinsiyet dağılımı

Variable Gender	Parasites Were Found	Parasites Were Not Established	Total	X <sup>2</sup>	P
Girl	30	45	75	0.750	0.258
Boy	11	24	35		
Total	41	69	110		

**Table 2.** The distribution of the parasite species**Tablo 2.** Parazitlerin türlerine göre dağılımı

Parasite Species	Number	%
<i>Ascaris lumbricoides</i>	14	34.1
<i>Entamoeba histolytica</i>	12	29.3
<i>Taenia saginata</i>	7	17.1
<i>Giardia intestinalis</i>	4	9.8
<i>Enterobius vermicularis</i>	3	7.3
<i>Trichuris trichiura</i>	1	2.4
Total	41	100

distribution of parasites for age groups is presented in [Table 4](#). Of the children diagnosed with parasitic infection, 30 (73.2%) were female and 11 (26.8%) were male. Of the children determined to be infected with intestinal parasites, 10 (24.3%) were aged 13 years, while 13 (31.8%) were aged 14 years, and 8 (19.5%) were aged 15 years. Furthermore, 5 (12.2%) were 16 years old, 3 (7.3%) were 17 years old, and finally, 2 (4.9%) were of the age 18.

**Table 3.** The distribution of diagnosed parasites for gender**Tablo 3.** Parazit tespit edilenlerin cinsiyete göre dağılımı

Gender	Number	%
Girl	30	73.2
Boy	11	26.8
Total	41	100

**Table 4.** The distribution of parasites for age groups**Tablo 4.** Yaş gruplarına göre parazitlerin dağılımı

The Group of Ages	Number	%
13	10	24.3
14	13	31.8
15	8	19.5
16	5	12.2
17	3	7.3
18	2	4.9
Total	41	100

## DISCUSSION

In cases of intestinal parasitosis, factors directly affecting the incidence of infection are level of education, food habits, traditions and customs, and socioeconomic and medicosocial living standards. In addition, geography, climate, meteorology and infrastructure are other factors influential on parasitosis. The above mentioned factors are highly variable in Turkey, and thereby, naturally, cases of parasitosis vary between different regions of the country <sup>3</sup>. It has been reported

that the prevalence of intestinal parasitosis ranges from 10% to 96% in the community, and that the socio-economic level of provinces and parasite incidence are inversely proportional to each other <sup>8,9</sup>. Similar to reports on the insignificance of the difference between females and males in parasite distribution for gender in foreign countries, no statistical significance has been reported in Turkey for parasitic infections in females and males, yet, it has been pointed out to the rates of infection being close to each other in the two sexes <sup>27</sup>. The present study investigated and demonstrated the distribution of intestinal parasites for gender, yet, it was determined that no statistically significant difference existed between females and males.

Previously conducted research has shown that the prevalence of intestinal parasites in children in Turkey ranges from 13% to 66% <sup>1</sup>. Furthermore, surveys conducted for parasitosis in primary school children in Turkey has demonstrated that the incidence ranges from 11.1% to 98.8% <sup>11</sup>.

In a study, in which 607 primary school students, 307 (48.5%) of which were girls and 300 (51.5%) were boys, were applied the cellophane tape method, it was determined that 16.14% were infected with *E. vermicularis* <sup>28</sup>.

In another study conducted in patients, who were referred to the clinics of the Faculty of Medicine of Cumhuriyet University with diarrhoea, the prevalence of intestinal protozoa was determined as 26% <sup>29</sup>. Furthermore, of 2351 faecal samples examined at the Parasitology Laboratory of the Faculty of Medicine of Kocaeli University, 257 (10.93%) contained parasites <sup>30</sup>.

In a study conducted in Burdur province for the investigation of the species, prevalence and socio-demographic and behavioural patterns of intestinal parasites in primary school children, the researcher collected 172 answers to a questionnaire, cellophane tape specimens and faecal samples from schools. The prevalence of intestinal parasites in the children included in the study was determined as 8.1%. The most frequently observed parasite species were *E. vermicularis* and *G. intestinalis*. The total rate of infection was 12.1% in boys and 3.7% in girls. The highest prevalence of intestinal parasites was observed in the children aged 11 years. Gender, average age and number of rooms were determined to be markedly correlated with parasitosis <sup>31</sup>.

In a study carried out in the Mother and Child Health and Family Planning Centre of Isparta province, 566 faecal samples (277 of which were taken from girls and 289 from boys) were examined for the presence of

parasites. Parasites were detected in 383 of the samples (121 of which belonged to girls and 262 to boys). Two hundred and sixty two of the cases of parasitic infection were in preschool children aged 0-6 years, and the most common parasite species was *E. vermicularis* <sup>32</sup>.

Of the 3628 patients, who were referred to the clinics of the Faculty of Medicine of Dokuz Eylul University in the year 2003, 237 (6.53%) and of the 4084 patients, who were referred to the clinics in the year 2004, 258 (6.31%) were diagnosed with parasitic infection <sup>27</sup>.

In a study conducted in primary school children in the city centre of Malatya province, of the 1838 students examined, 415 (22.5%) were diagnosed with parasitic infection. The most common parasite species was *E. vermicularis* (10.6%) <sup>33</sup>.

In a study carried out in 110 higher education students in Van province, 34 (30.9%) were determined to be infected with at least one parasite species <sup>34</sup>.

Doğan et al, in a study carried out at two different orphanages in children aged 0-6 years and 7-12 years, reported the prevalence of parasitic infection to be 51% and 54% in the 0-6 and 7-12 age groups, respectively <sup>35</sup>.

Durmaz et al.<sup>7</sup> in a study in which they investigated the prevalence of intestinal parasites in primary school and orphan children in Malatya province, examined faecal samples belonging to 94 orphan children and 560 primary school children aged 7-11 years. Of the orphans, 89.4% were diagnosed with parasitic infection and the most frequently observed parasite was *E. vermicularis*. The rate of intestinal parasitosis was 77.1% in the primary school children with the most common parasite species being *G. lamblia*.

Yılmaz et al.<sup>11</sup> reported that of the 3505 children aged 0-13 years, who were referred to the Parasitology Laboratory of the Faculty of Medicine of 100. Yıl University in the year 1996, 779 were diagnosed with parasitic infection. The researchers determined that the most common parasites species were *E. histolytica* and *A. lumbricoides*.

In Niğde province, Topçu and Uğurlu <sup>10</sup> have reported on the species associated with parasitic infection in primary schools with different conditions, and have also demonstrated the distribution of these parasites for age, gender and socioeconomic level.

In the present study the incidence of parasitosis in children cared for at the Niğde Orphanage was determined as 37.1%. In particular, due to the cellophane tape method not being able to be used for

the diagnosis of *E. vermicularis* infections, it is considered that values lower than the actual parasitosis incidence may have been obtained. In the present study, 61% of the parasitosis cases were determined to be caused by protozoa, while 39% were ascertained to be caused by helminths.

As observed in the present study, differences in the aforementioned factors influence the incidence and prevalence of parasitosis. The species *A. lumbricoides*, which is very common in Eastern, South-eastern and Central Anatolia, was also determined at a high rate in this study. Factors, which determine the occurrence of parasites, are frequently observed in locations where people reside collectively, such as orphanages. In such places, age is observed to be a more influential factor. In view of the wealth of information gained to date, for the community to overcome this problem, it is essential that public awareness is raised and each individual takes responsibility. Appropriate sanitation and food habits should be established and maintained. Medical staff appointed for such services should be well-educated. The significance of preventive medicine should be communicated to the public. Accordingly, to achieve this target, the relationship between medical staff and families should be strengthened. Furthermore, all departments, units, institutions and organizations involved in public service should fulfil their responsibilities with a high level of awareness. In view of the fact that the source of many parasites is humans and that cysts excreted in the faeces are transmitted by the faecal-oral route, adequate importance should be attached to infrastructure and environmental health services. Responsible institutions and organizations should cooperate in harmony. Prevailing infections should be eliminated and prevented through the treatment of infected persons and the improvement of environmental conditions. In other words, treatment and prevention should be implemented together. In locations, where prevalence and incidence rates are already high or are expected to be high, people should be subjected to regular health checks, surveys should be conducted and people should be educated with a view to raise public awareness. In terms of preventive medicine and treatment, the education of the public and the raising of public awareness bear great significance.

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