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Prevalence of *Toxocara* spp. Eggs in Public Parks of the City of Aydın, Turkey

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SUMMARY: Children are the risk group for toxocariasis because they often play in public parks which are easily contaminated and also because pica is common among children. In the current study, soil samples from 111 parks in Aydin, a city in western Turkey, were assessed. Out of 111, 21 (18.91%) were contaminated with *Toxocara* spp eggs. Our public parks showed a high toxocariasis risk in our city and the need for preventive studies.

Key Words: *Toxocara*, Aydin, public park

Aydın İl Merkezindeki Parklarda *Toxocara* spp. Yumurta Görülme Sıklığının Araştırılması

ÖZET: Çocukların *Toxocara* spp. yumurtaları ile kontamine olan parklarda oynamaları ve pikanın bu yaş grubunda sık görülmesi nedeniyle toxocariasis riskinin çocuklarda yüksek olduğu bilinmektedir. Bu çalışmada Aydın il merkezindeki 111 parktan alınan toprak örneklerinin incelenmiş ve bu örneklerin 21 (%18,91)'inde *Toxocara* spp yumurtası saptanmıştır. İlimiz parklarının *Toxocara* spp yumurtaları ile kontamine olduğu saptanmış olup, insanlara bulaşmayı önleyici tedbirlerin alınmasının gerekli olduğu düşünülmüştür.

Anahtar Sözcükler: *Toxocara*, Aydın, park

INTRODUCTION

The ascarids *Toxocara cati* and *Toxocara canis* are probably the most common gastrointestinal helminths of domestic canids and felids world-wide (25). Both species are known causative agents of human toxocariasis. Human toxocariasis is acquired by ingesting the ascarids eggs, which are shed in the feces of infected dogs and cats The clinical spectrum of the disease comprises four syndromes, namely visceral larva migrans (VLM), ocular larva migrans, and the more recently recognized 'common' (in adults) and 'covert' (in children) pictures (19). Sero-epidemiological studies showed that many people, especially in children, are infected with *Toxocara canis* (30).

Children are the risk group for this infection because they are often playing in the places which are easily contaminated (24). Moreover, geophagia or soil eating, a specific type of pica that increases the risk of toxocariasis, is common among children (19, 27). The high risk places for contamination are especially playgrounds and the other public parks (1, 8, 9, 29). In Medline search, there are a few studies done in our country on the prevalence of *Toxocara* eggs in soil samples. Additionally, they are all from different parts of Turkey, without a western region sample (12, 22). The current study is designed to predict the prevalence of *Toxocara* eggs in public parks and playgrounds of central Aydin province, a western city of Turkey.

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MATERIALS AND METHODS

There were 167 public parks in central Aydin city at the study time. The prevalence of *Toxocara* eggs in soil samples was estimated as 30% in average; a sample size was calculated as 111 (66.5%) out of 167 parks. The city was divided into 3 strata according to the distance to the Centrum and number of sampling places was calculated according the strata weight for parks. Only one sample was taken from each park.

The samples were especially taken from the places where children preferably played games. A total of 250-300 grams soil including an area of 20 cm^2 with 10 cm in depth was collected from each park. The sample was separately carried to the laboratory in a polyethylene bag. The sampling was done from the late May to the early June. Soil samples are

examined by the method proposed by Dunsmore *et al*. (7). All samples taken from 111 parks were examined.

RESULTS

Twenty-one (18.91%) of the samples were found to be contaminated with *Toxocara* eggs. All of them were embriyonated eggs.

DISCUSSION

It is common to see cats and dogs in public parks in many of city centers in Turkey. Additionally, there is an increase in the number of cats and dogs in recent years. This increase possibly depends on increasing number of pet owners and the number of stray animals. All these animals defecate in public parks as well as the other places. Many studies show that egg prevalence of protozoa and helminth which can cause disease in human significantly increases in soil samples (19). The risk of contamination from soil is more than being in direct contact with cats or dogs. This is because eggs need a period of time to be incubated in soil to be infective (24). Although all population using parks is prone to contamination, children who are the real players of the parks are under more risk than the adults. Additionally, the prevalence of pica in children is increasing the risk of contamination even more (27). In our study, we found 21 out of 111 soil samples taken from the parks in Aydin were contaminated. The prevalence of *Toxocara* egg was 18.91%. The results of *Toxocara* egg prevalence in soil samples in various places were given in Table 1. It is seen that a range of the results is quiet wide from 1.2% to 87, 1%. It is not possible to make an accurate comparison between the results of all these studies.

Differences between the temperatures, soil types, raining properties and the study methods are barriers for an accurate comparison. The changes in population of cats and dogs are also effective on results as well as these factors. In our study soil samples are collected at the end of rainy days, in late May and early June. In this period there are a large number of child dogs and cats around. They carry *Toxocara* eggs with a higher prevalence than their parents. Children also play often in public parks in this season. There are a few studies about *Toxocara* prevalence in our country. One of was performed in Ankara province, a city from central Anatolia and 30, 6 % of soil samples was found to be contaminated by *Toxocara* eggs (22). Another research in Konya province, also from central Anatolia, soil contamination prevalence was found to be 4.2% (12). The Konya study was a follow-up study for 12 months, the *Toxocara* eggs were found in July and February in the samples of the same park. The sampling time was not given in Ankara study. It is reported that the number off eggs recovered decrease following fence construction around sandpits (1). Public parks included in our study were not surrounded by hence. These parks are more prone to contamination because cats and dogs can freely survive in them.

Table 1. *Toxocara* egg prevalence from the lowest to the highest in soil samples in various places

City or Region/ Country	Prevalence (%)	Sample (n)	References
Aydin / Turkey	18, 9	111	Current study, 2002
Marche / Italy	34.0	24	Habluetzel et al., 2003 (14)
Murcia / Spain	1, 2	644	Ruiz de Ybanez MR *et al* 2001 (28)
Resistencia / Argentina	1, 3	475	Alonso JM et al. 2001 (3)
Ankara / Turkey	30, 6	170	Öge and Öge, 2000 (22)
Konya / Turkey	4, 2	48	Güçlü and Aydenizöz, 1998 (12)
Havana / Cuba	42.2	45	Dumenigo B et al., 1995 (6)
Basrah / Iraq	12, 2	180	Mahdi and Ali, 1993 (20)
Dublin / Ireland	5.6	53	Holland et al, 1991 (15)
London / UK	6, 3	521	Gillespie et al., 1991 (10)
Hannover / Germany	30.8	208	Horn, 1990 (16)
Amman, Ibrid, Jerash, Zarga / Jordan	15, 5	226	Abo-Shehada, 1989 (2)
Michigan / USA	19, 0	114	Ludlam and Platt, 1989 (18)
Illinois/ USA	16, 3	135	Paul et al., 1988 (26)
Halifax / Canada	2.3	567	Gualazzi et al, 1986 (11)
Frankfurt / Germany	87.1	31	Düwel, 1984 (8)
Kansas / USA	20, 6	282	Dada and Lindquist, 1979 (5)

There are a few studies about VLM prevalence in human in our country. In a study on VLM seroprevalence in 186 students aged 5-16.60 (32.3%) of them found to be seropositive with IgG antibodies (23). In another study, 33.8 % of 177 children, ages between 1-10 years, found to be seropositive (4). The prevalence was 51.35% with 19 of 37 children (5-12 years of age) having chronic abdominal pain (13). In the western part of Turkey, the *Toxocara* prevalence found to be 44.28 % in patients having hepatomegaly (17). All these studies show that *toxocariasis* is an important health problem in Turkey. Düwel *et al.* showed that after artificial contamination of 100 *Toxocara* eggs, only 55-60 of them were observed in 7 distinct observations (8). Depending on this finding it can be suggested that microscopic observations can

only show half of the eggs in soil samples. For this reason, we used the soil examination method proposed by Dunsmore *et al.* because it is showed to be the best egg detection method by Öge and Öge (21). By this method it can be possible to detect 75-90% of *Toxocara* eggs. It was concluded that even in the presence of the limitation of the current method, the *Toxocara* egg prevalence of 18.91% in our public parks showed a high toxocariasis risk in our city and the need for preventive studies.

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