Prevalence of Toxocara species eggs in public places and childrens play grounds of Anassiriyah city

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Abstract

To determine the prevalence of Toxocara species eggs in public places and childrens play grounds 645 soil samples were collected from 8 urban regions in Alnassiriyah city center, southern Iraq during September 2006 to September 2007. Toxocara species eggs found in 106 samples. Contamination with these eggs observed in all sites. Gardens soils were more Contaminated than bare soils. Higher Contamination rate noticed in February and March while it decreased to lower level in August.

انتشار بيوض طفيليات اسكارس القطط والكلاب في الأماكن العامة وملاعب الأطفال في الناصرية

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الخلاصة

بغية الكشف عن وجود التلوث وتحديد نسب انتشار بيوض الطفيليات السهمية (اسكارس القطط والكلاب) في الأماكن العامة وملاعب الأطفال، تم جمع 645 نموذج تربة من 8 مواقع مختلفة في مركزمدينة الناصرية والتي تصنف كمناطق حضرية خلال الفترة من ايلول 2006 – ايلول 2007 .اظهرت النتائج تلوث جميع المناطق المشمولة بالدراسة ببيوض الديدان المذكورة ، إذ كشف عن وجود تلك البيوض في 106عينة (16.43%) .كانت نسبة تلوث المناطق المزروعة تزيد عما هي عليه في المناطق العارية من الغطاء النباتي. كشفت الدراسة عن وجود علاقة بين معدلات انتشار البيوض وأشهر السنة، إذ كانت نسبة الانتشار خلال شهر أيلول 8.47% تزايدت تدريجيا حتى وصلت الى أعلى مستوياتها في شهري شباط 30.76 % وآذار30.18% ثم أخذت بالانخفاض لتصل أدنى مستوى لها خلال شهر آب 5.76 %.

INTRODUCTION

Toxocara species are roundworms from ascaridae family that are a common intestinal parasite of dogs and cats (1,2). The presence of Toxocara species eggs in soil is considerable as a risky factor for public health (3). These eggs may remain in soil for months or even years(4). Children's play habits and their attraction to pets put them at higher risk for infection (5,6). When the eggs are accidentally ingested by human from soil contaminated with the feces of infected animals, they hatch in the intestine and the larvae migrate from intestine to human liver, lungs and other organs where they cause damage and allergic reaction. Infections may leave children with permanent visual or neurological damage(7-11). Alnassiriyah is city with a large stray dogs and cats population , these fact has led to survey of the presence of Toxocara species eggs in public places soil in this city.

MATERIALS AND METHODS

From September 2006 to September 2007, 645 soil samples were collected from :-
1- Public gardens : - (A) Alkornish (B)Ghazi garden (C)Aldob garden (D) AlMutenezih.
2-Childrens play ground in (E) Alsalhiyah (F) Sumer (G) AlEskan (H) AlEmarat. In Anassiriyah city. Samples were taken randomly at different point from uppermost inch of soil . Samples stored in screw capped plastic containers.

In laboratory, all soil samples were examined for Toxocara eggs according to standardized recovery technique (12) briefly : -
50 g of soil from each sample was placed in a 250 ml glass beaker, toped with water to a final volume of 200 ml . The mixture was thoroughly homogenized with a glass stick and left to decant for 20 seconds before being filtered through a coarse sieve (pore size 0.1 mm) to remove large size debris. The mixture was homogenized again and transferred into two 100 ml centrifuge tubes which were centrifuged at 150 G for 5 minutes. One of the tubes was randomly selected; the supernatant liquid was discarded while the precipitate was suspended again in 60 ml of flotation fluid (magnesium sulfate 1.20 specific gravity). This suspension was divided into four 15 ml tubes which were each filled to the brim. The mouth of the tubes was covered with a 18x18 mm cover slip in contact with the fluid meniscus. The 4 tubes were centrifuged at 150 G for 5 minutes. The four cover slips were then removed, placed on a slide, and examined microscopically. a cover slip was considered positive if at least one egg was detected. Toxocara eggs were distinguish according to their morphological aspects(13). The chi-squared test was used for statistical analysis.

RESULTS

The results showed that all the 8 regions in this study were contaminated with Toxocara eggs ,specially gardens . These eggs recovered from 106(%16.43) samples of the 645 samples were examined. A highest contamination rate observed in region C (25.39%) and the lowest in region E (8.57%). Table (1). The prevalence was significantly higher in puplic gardens ($p < 0.05$).

Table (1) Distribution of positive soil samples with Toxocara eggs according to region.

Region	Number of samples tested	Number of positive samples	% of positive samples
A	127	28	22.04
B	72	15	20.83
C	63	16	25.39
D	123	23	18.69
E	70	6	8.57
F	70	7	10.00
G	60	5	8.33
H	60	6	10.00
Total	645	106	16.43

We noticed that there was a relation ship between Toxocara eggs prevalence in that tested soils and months of year, from September 2006 to August 2007, contamination rate in September was % 8.47 increased gradually until reached peak in February and March (% 30.76, % 30.18), then decreased until reached to lowest level (%5.76) in August. Table (2). Contamination rate was significantly higher in winter and spring (from Decermber to May) ($p< 0.05$).

Table (2) Distribution of positive soil samples with Toxocara eggs according to months of year.

month	Number of samples tested	Number of positive samples	% of positive samples
September	59	5	8.47
October	56	5	8.92
November	54	6	11.11
Decermber	54	11	20.37
January	52	13	25
February	52	16	30.76
March	53	16	30.18
April	53	15	28.30
May	54	8	14.81
June	53	4	7.54
July	52	4	7.69
August	52	3	5.76
Total	645	106	16.43

DISCUSSION

Previous reports have noted the presence of Toxocara species infection in stray dogs and cats (14-16) which may indicate that there is possibility of human infection from the environment in public places . There was many studies undertaken in public places to estimate the contamination rate of Toxocara eggs. contamination rate recorded in Basra was 12.2% (17). In northern and central of Jordan Toxacara eggs were found in 15.45% o were collected from school playgrounds and public places(18). contamination rate reached in some area of Shiraz to 12-22 % during wet season (19). 8. 25% - 60.9% of Public parks in Turkey was contaminated (20,21). contamination rate of playgrounds in Japan ranged between 41.9% - 63.3% (22,23) . 54.5% of Public parks and playgrounds in Malaysia was contaminated (24). Kandy Tea plantations, gardens in Sri Lanka reported 7.8%- 21.6% contamination rate(25) .8 7.1% of playgrounds in Frankfurt , Germany was contaminated (26) . Toxocara eggs were found in 24.4% of soil samples which collected from Public places in Britain(27). In Greece 97.5% of Public parks contaminated by Toxocara eggs(28). In Spain , Madrid contamination rate of public parks was 47.3%(29). Argentina, Buenos Aires contamination rate of public parks was 7.2%(30) . The recovery rate of Toxocara eggs from soil samples in united states vary from 20.6% in Kansas(31) to 10.2% in Philadelphia (1)to 0.3% in Newjersy(32). In Havana ,Cuba the prevalence Of Toxocara eggs in soil samples was 42.2% (33). the contamination of public places with Toxocara eggs in Brazil was 60% (34).

We detected Txocara eggs from 106 (16.43%) of 645 soil samples. It is seen that a range of the results is quiet wide . It is not possible to make an accurate comparison between the results of all these studies. The recovery of parasite eggs from different locales will obviously vary depending on environmental conditions, soil types, choice of sampling sites , the number of animals defecating in the sampled area ,recovery methods and the prevalence of patent Toxocara infections in those animals(35 , 36 , 37 , 38).contamination rate in our study may result from poor environmental sanitation specially the presence of large stray dogs and cats population.

We found that the contamination rate of the four gardens (site A – D) highest than bare places (site E – F) . This accepted with a Similar study showed that soil samples obtained from gardens more frequently contaminated by Toxocara eggs than samples removed from bare places(37) . The cause of that may be return to the preference of these places by stray dogs and cats in addition to that these area was always humid and Toxocara eggs can remain viable at least months in humid soil(39) . While prolonged exposure to the sun in poor vegetation and dry soil may cause quick disintegration of the Toxocara eggs (36).

In the first month (September) of our survey , 8.47% of soil samples tested showed positive result. this percentage increased gradually during the latter months until reached peak at February and March .Then it begun to decreased and reached t o lowest level in August. This is consistent with another studies (19,40)which recorded highest contamination rate during wet or rainy seasons. In public parks soil of Tokushima -Japan ,a higher frequency of Toxocara eggs recovered at Autumn , Spring and beginning of Summer(22). While in a survey carried out in

Brazil along 18 months (from February 2004 to July 2005) observed the occurrence of two peak of higher frequency of *Toxocara canis* eggs in public parks soil, one in 2004 from February to May and the other in 2005 from April to July(41).
Climate conditions (specially temperature , humidity and rain) were important factors for Nematode eggs(42), therefore ; the differences in climate conditions from place to place and from year to year in the same place may lead to differences in contamination rate which recorded along the months of year in different places or even in the same place during different years .
In Iraq a good conditions (mild temperature , humidity and rain) for maintenance and dispersion Toxocara eggs may be found in winter and Spring therefore ; highest contamination rate obtained during the months of these seasons in our study.

REFERENCES

1- Dubin, S.; Segall, S .and Martindale, J.(1975). Contamination of soil in two city parks with canine nematode ova including Toxocara canis: a preliminary study. Am. J .Public Health. November; 65(11): 1242–1245.

2- Parsons J. (1987). Ascarid infections of cats and dogs. Vet.Clin .North Am. Small Anim.Pract., 17(6):1307-1339.

3- Ruiz De Ybáñez, M. ; Garijo, M.; Goyena, M. and Alonso, F.(2000). Improved methods for recovering eggs of Toxocara canis from soil. J Helminthol. Dec.;74(4):349-53.

4- Bowman,D. (1999). Georgis' parasitology for veterinarians, W.B.Saunders company, Philadelphia. 430pp .

5- Nakamura, S.; Sotoyama, T.; Hayasaka, S.; Kameyama, Y.; Maruyama, S.and Katsube, Y.(1991) .Parasitism of Toxocara canis larvae in Japanese quails by inoculation of the ascarid eggs. J. Vet. Med .Sci., 53 (5): 865-872.

6- Overgaauw P. (1997). Aspects of Toxocara epidemiology: Human toxocariasis. Critical Rev. Microbiol. , 23: 215-231.

7-Beaver,P.C.(1969).The nature of visceral larva migrans.J.Parasitol.55(2):3-12

8- Urquhart, G.M.; Armour, A.J.; Duncan, J.L.; Dunn, A.M.and Jennings, F.W.(1987) .Veterinary Parasitology. Longman Sci Tech, Essex,England.

9- Magnaval, J.; Glickman, L.; Dorchies, P.and Morassin ,B.(2001).Highlights of human toxocariasis. *Korean J Parasitol* ., 39(1): 1-11.

10-Soulsby, E.(1965).Textbook of veterinary clinical parasitology, Vol.1 Helminths. Blackwell Sci. Publ., Oxford.

11- Schantz, P.M. (1998).*Toxocara* larva migrans now. Amer. J. trop. Med. Hyg., 41(3)
(suppl.): 21-34.

12- Zenner, L.; Gounel, M. and Chauve, M.(2002). A standardized method for detecting parasite eggs and oocysts in soils.Revue Méd. Vét. 153, 11: 729-734.

13- Nolan, T.(2005).VETERINARY PARASITOLOGY LABORATORY VPTH603. University of Pennsylvania.U.S.A. P.P.92.

14-Ferroglio, A.; Romano, S.; Passera, A.; D'Angelo, P.; Guiso, E.and Ghiggi,E.(2006).Dog's parasite and zoonotic risk: from old to new "emergencies" in the North-West of Italy Parassitologia *48:* 115-116.

15- William,G. (1967).Helminth survey of dogs and cats in New Jersy.The journal of parasitology 53(5):1082 -1084.

16- Sadjjadi,M.(2001). Prevalence and intensity of infestation with *Toxocara cati* in stray cats in Shiraz.Veterinarski arhiv7(3):149-157.

17-Mahdi, N.K. and Ali, H.A. (1993). Toxocara eggs in the soil of public places and schools in Basrah, Iraq. Ann Trop Med Parasitol .Apr;87(2):201-5.

18 - Abo-Shehada, M.N. (1989). Prevalence of Toxocara ova in some schools and public grounds in northern and central Jordan. Ann Trop Med Parasitol. Feb;83(1):73-5.

19- Motazedian,H.;Mehrabani,D.;Pakniat,A. and Tavalali,M.(2006).Prevalence of helminth ova in soil samples from public places in Shiraz.Who-Emro .sep.12(5):42-47.

20-. Gi, F.and Aydeniz, M.(1998).ocuk parklarÝndaki kumlarÝn k.pek ve kedi helminti yumurtalarÝ ile kontaminasyonunun tesbiti. T.rk Parazitol Derg, 22 (2): 194-198.

21. .Ge, S.and Ge, H.(2000) .Prevalence of Toxocara spp. eggs in the soil of public parks in Ankara, Turkey. Dtsch tierarztl Wschr, 107:72-75.
22- Shimizu, T.(1989). Prevalence of Toxocara eggs in sandpits in Tokushima city and its outskirts. J Vet Med Sci, 55 (5): 807-811.

23- Uga, S.; Matsumura, T.; Aoki, N.and Kataoka, N.(1993). Prevalence of Toxocara species eggs in the sandpits of public parks in Hyogo Prefecture, Japan. Jpn J Parasitol, , 38 (5): 280-284.

24-Loh, A.G.and Israf, D.A.(1998). Tests on the centrifugal flotation technique and its use in estimating the prevalence of Toxocara in soil samples from urban and suburban areas of Malaysia. J Helminthol, 72 (1): 39-42.

25- Edirisinghe, J.S.and Weilgama, D.J.(1997) .Soil contamination with geohelminth ova in a tea plantation. Ceylon Med J, , 42 (4):167-172.

26 - Duwell, D.(1984).The prevalence of toxocara eggs in the sand in children Õs playgrounds in Frankfurt. Ann Trop Med Parasitol, 78(6): 633-636.

27- Borg ,A. and. Woodruff ,W. (1973). Prevalence of Infective Ova of Toxocara Species in Public Places. Br Med J. Nov. 24; 4(5890): 470–472.

28. Himonas, C.; Antoniadou-Sotiriadou, K.and Frydas, S.(1992). Research survey on the prevalence of toxocara ova in the soil of public parks in Thessaloniki Helliniki-Tatriki, 58 (5): 333-339.

29- Angulo-Madero, R.;Puento, C.A. ; Guillen-Llera, J.L.; De la Puento, C.A.and Aguila de la Puente, C.(1987).Contamination of the soils of public parks with Toxocara canis. Rev Iberica Parasitol, ,1(5): 165-171.

30- Sommerfelt, I.; Degregorio, O.; Barrera, M.and Gallo, G.(1992).Presence of Toxocara eggs in public parks of the city of Buenos Aires,Argentina, 1989-90. Rev Med Vet Buenos Aires, , 73 (2):70-74.

31- Dada,B.and Linqist ,W.(1997).Studies on floatation techniques for the recovery of helminth eggs from soil and the prevalence of eggs of Toxocara spp.in Kansas.J.Am. Vet. Med.Assoc.,174:1208-1210.

32-Surgan,M.;Colgan,K.and Paffman,J. (1980).Asurvey of canine toxocariasis in Essex County, NewJersy.Am.J.Puplic health,70:1207-1208.

33- Dumenigo, B.and Galvez, D.(1995). Soil contamination in Ciudad deLa Habana province with *Toxocara canis* eggs. Rev Cubana Med Trop, 47(3): 178-180.

34- Santarem, V.A.;Sartor, I.F.and Bergamo, F.M(1998) .Contamination byToxocara spp. eggs in public parks and squares in Botucatu, Sao Paulo State, Brasil. Rev Soc Brasileira Med Trop, , 31 (6):529-532.

35- Fazıl Serdar, G.; Sema,E.and Pınar, O.(*2005*) . Prevalence of *Toxocara* spp. Eggs in Public Parks of the City of Aydın, Turkey . *Türkiye Parazitoloji Dergisi, 29 (3): 177-179*

36- Child,J.(1985).The Prevalence of Toxocara species ova in background and gardens of Baltimore.AM.J. public health,75:1092-1094.

37- Divani , C.and Gutemberg, R.(2005). Environmental contamination by Toxocara sp.eggs in Ribeirao preto,Sao Paulo state, Brazil. Rev. Inst. Med. trop. S. Paulo 47(4):223-226.

38- Nunes, C.; Sinhorini, I.and Ogassawara ,S. (1994).Influence of soil texture in the recovery of *Toxocara canis* eggs by a flotation method .Vet Parasitol. Jun;53(3-4):269-74

39- Schantz, P.M. (1978). Toxocara visceral larva migrans. Engl. J. Med.,298(1):436-439.

40- Nurdian, Y.(2004).Soil Contamination By Intestinal Parasite Eggs In Two Urban Villages Of Jember.Jurnal ILMU DASAR Vol. 5 No. 1, : 50-54.

41- Maisa Leite ,Q.; Marcelo, S.; Paschoalotti, M.and Chieffi, P.(2006).Frequency of soil contamination by *Toxocara canis* eggs in the south region of São Paulo municipality (SP, Brazil) in a 18 month period. Rev Soc Brasileira Med Trop, ,30 (2):500-503.

42- Widjana, M.; Sutisna, P. (1993). Some Epidemiological Aspects of Hookworm Infections Among The Rural Population of Bali, Indonesia. *Southeast Asian J. Trop. Med.*
***Public Health*, 24: 87-93.**