

PREVALENCE OF TOXOCARA SPP. EGGS IN THE SOIL OF PUBLIC AND PRIVATE PLACES IN LUDHIANA AND KELLON AREA OF PUNJAB, INDIA

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Deux cent huit échantillons ont été récoltés à partir de 7 parcs publics, 3 autres places publiques et 10 places privées au village Kellon, dans la cité Ludhiana et les environs. Quarante et un (19,7 p. cent) contenaient des œufs de Toxocara. Ils provenaient d'une large variété des endroits étudiés (urbains, suburbains et ruraux), c'est-à-dire de parcs publics, de zones de jeu, d'arrière-cours, de rues, de bas-côtés, de jardins publics et privés, en nombres variés. Aucune zone n'était libre d'œufs de Toxocara. Pour l'ensemble, 93 œufs de Toxocara ont été trouvés, 47 au stade larvaire, 27 au stade de jeune ver et 19 au stade de blastomères ou non segmentés. Les places publiques urbaines étaient moins contaminées que les zones rurales. Parmi les sites étudiés, les terrains de jeu d'enfants, les arrière-cours et les parcs étaient plus contaminés que les autres sites. L'étude a indiqué qu'à Ludhiana, Kellon et probablement aussi dans d'autres régions de l'Inde, la contamination des endroits publics ou privés par les fèces de chien est un important risque de santé publique.

INTRODUCTION

Human toxocarosis is widely distributed throughout the world in both temperate and tropical countries and was recognised as a common clinical entity (Schantz and Glickman 1979). Direct contact with dogs that harbour adult *Toxocara* worms is unlikely to give rise to an infection in humans because once passed, the ova must undergo a period of development in the environment before they can become infective, and embryonated ova can remain viable for some considerable length of time in soil (Glickman and Schantz, 1981). Infection of humans is accidentally by ingestion of eggs containing larvae which is a direct consequence of soil contamination with dogs and cats faeces containing *Toxocara* eggs. The presence of *Toxocara* eggs in the environment is an indicator of the potential risk of human infection. The prevalence of soil contamination has been reported by others (reviewed by Barriga, 1988). Small children are considered to be at risk from geohelminth infections because of their lifestyle and their playing environment, especially those children with a history of pica (Glickman and Schantz, 1981; Düwel, 1984). Public parks, particularly playgrounds that are heavily fouled by dogs and cats may be an important source of infection (Borg and Woodruff, 1973; Snow et al., 1987; Gillespie et al., 1991). Visceral larva migrans (VLM) has been frequently reported from Madras, Calcutta and other parts of India. However, it is agreed that there is an all round under-reporting of these cases due to difficulty in diagnosis of the condition. In India, however, only a few epidemiological studies have been made, although hundreds symptomatic cases of visceral or ocular larva migrans syndromes among people have been reported. The aim of this study was to determine the distribution and extent of *Toxocara* spp. eggs in a variety of public and private places in Ludhiana and Kellon area (Punjab, India) where there is a large number of registered and stray dogs, and the number of cats is unknown.

MATERIALS AND METHODS

Many sites in and around city Ludhiana and village Kellon were studied: seven public parks, three other public places and ten private places in urban and rural area (Table 1). Between 16th August and 15th November of 1996, 208 soil samples, each about 100 g weight were collected from representative areas at examined sites. Samples were collected by randomly selecting suitable areas in the examined sites. Samples were not removed from an area where there was clear evidence of fouling by either dogs or cats. The soil samples were examined immediately after drying and sifting. *Toxocara* eggs were identified microscopically on the basis of size and typical morphology in 20g soil portions by floatation in saturated sodium nitrate solution (1.35) using Dada's technique. The sensitivity of this method was found to be 65% (Dada, 1979).

RESULTS

The prevalence of *Toxocara* spp. eggs in soil samples in the study areas is reported in table I. Of 208 soil samples examined 41 (19.71%) were positive for *Toxocara* (at least 1 egg in a sample). They were present in a wide variety of examined places (urban, suburban and rural) i.e. public parks, playgrounds, backyards, streets, roadsides, canal sides, public and private gardens, although their number varied. Altogether, 93 *Toxocara* eggs were found, 47 in larval stage, 27 in early vermiform stage and 19 with blastomeres or unsegmented stage. The urban public places were slightly less contaminated as compared to rural areas. Out of investigated sites, children's playgrounds, backyards and parks were comparatively more contaminated as compared to other selected sites. No area was found to be free of *Toxocara* eggs. The soil in the public places was found to be comparatively more contaminated as compared to private places.

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Table I
Presence of *Toxocara* spp. eggs in the soil in city Ludhiana, village Kellon and surrounding areas

Area examined	No. Of sites sampled	No. Of samples	Positive Samples	
			no.	%
Ludhiana				
Parks*	7	56	12	21.43
Playgrounds**	2	20	4	20.00
Backyards	3	22	5	22.73
Streets, roadsides and canal sides	6	26	3	11.54
Private places	5	20	2	10.00
Kellon				
Public places	5	40	11	27.50
Private places	5	24	4	16.66
Total		208	41	19.71

* Rose Garden, Rakh Bagh, Chattar Singh Park, Atam Park, Agar Nagar Park, Sarabha Nagar Park-I and Sarabha Nagar Park-II.

** Dresi ground and PAU ground.

DISCUSSION

In many countries contamination with *Toxocara* eggs ranges from 1 to 25% of the soil samples examined with an average 68% of the eggs recovered appearing viable (Barriga, 1988). In the study presented, 19.71% of the soil samples contained *Toxocara* eggs. The results suggest that the concentration of *Toxocara* eggs in the soil of the study areas of Punjab (India) is higher than in Switzerland -1% (Salm, 1986), Austria - 6% (Pfeiffer, 1983), Poland -10% (Mizgajska, 1995), and Russia - 12% (Vetata and Mamykova, 1984) but lower than in Great Britain -24% (Borg and Woodruff, 1973). The real quantity of *Toxocara* eggs in the soil however, depends on the sampling and recovery methods, the geographic location, the number of samples examined, and their volume (Glickman, 1993).

A comparison of the prevalence of *Toxocara* eggs in parks indicates that contamination of these places in Ludhiana (21.43% samples positive) is smaller than in Montreal, Canada - 25.6% (Ghadirian et al., 1976), in Mosul, Iraq - 25.5% (Woodruff et al., 1981), in London - 66% (Snow et al., 1987) in Perugia, Italy - 30% (Moretti and Piergili Fioretti, 1988) and many UK cities where 21-29% samples are positive (Borg and Woodruff, 1973). However, it is larger than in Kansas, U.S.A. (21% positive; Dada and Lindquist, 1979) Strathclyde, Scotland (7.3% positive; Quin et al., 1980), Vilnius, Lithuania (8% positive, Bajoriniene and Balkjwiczius, 1988), St.Joseph/Benton Harbor, USA (19% positive; Ludlam and Platt, 1989), Dublin, Ireland (14.9% positive; O'Lorcain, 1994) and Poznan, Poland (17% positive, Mizgajska, 1995).

The conclusion is that parks, playgrounds should be protected from dogs and cats. It was also found that the range of soil contamination with *Toxocara* eggs was dependent on the type of place examined. Contamination was more in parks, playgrounds and backyards as compared to roadsides, streets, canal sides, and private places. Public places in rural areas were comparatively more contaminated than in urban areas. The concentration of *Toxocara* eggs in public places and private places is alarming given that many children play there. The exposure to *Toxocara* eggs may be particularly high among children, especially if one considers that *Toxocara* spp. eggs can survive in the soil for several years (Muller, 1953). The overall prevalence of *Toxocara* spp. ova from soil samples observed in this study fall within 10 to 27.50% range. The results indicate that in Ludhiana and Kellon and probably also in other regions in India, the contamination of public and private places with dog faeces is an important public health risk.

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