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Recovery of Helminth Ova from Soil in Ibadan Metropolis

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Abstract

The prevalence of soil-transmitted helminth infection was assessed through collection of soil samples from different places in Ibadan South Western Nigeria, using standard parasitological technique. 670 samples were collected from veterinary clinics, residential areas, zoological garden and public places. Two hundred and sixty five were positive for helminth ova. The study revealed an overall prevalence of 39.6%. Veterinary clinics has soil helminth ova prevalence rate of 44.1%, residential areas 60.0% Zoological garden 50.0% and public places 0.0%. Ascarid, Strongyle and Ancylostoma species were identified during the survey.

Keywords: Helminth ova, soil, zoonoses

Introduction

Soil transmission of helminth infection is a major public health problem in poor and developing countries which have constituted a universal burden (Dada *et al.* 1979; Chan *et al.* 1994; Andrade *et al.* 2001 and Guayatt, 2002). Different species of soil transmitted helminthes infect man and animals especially in the tropical and subtropical parts of the developing world. However, some helminthes are widely prevalent and distributed, resulting in millions of human and animal infections. These include large roundworm, *Ascaris lumbricoides*, *Ascaris suum*, *Neoascaris vitulorum*, *Toxocara cati*, *Toxoascaris leonina*, whipworm, *Trichinella spiralis*, hookworm (Ancylostoma), *Ancylostoma duodenale*, *Necator americanus*, *Strongyloides stercoralis* and *Haemonchus contortus*, all of which are nematodes, (Atkinson, 1973; Campbell *et al.* 1999). Most of the intestinal helminthes have their eggs being passed

out with the faeces of the animal while some have the larvae being passed out with faeces (Borecka and Gawor, 2008).

It has been estimated that almost 2 billion people are infected with helminthosis and more of these soil-transmitted helminths, accounting for up to 40% of the global morbidity from infectious diseases, exclusive from Malaria. The greatest number of soil-transmitted helminthes ova infections occur in tropical and subtropical regions of Asia, especially China, India and South east Asia, as well as SubSaharan Africa. Out of One to two billion soil-transmitted helminth infections worldwide, approximately 300 million infections result in severe morbidity which are associated with the heaviest worm burdens (Capuano and Rocha 2005).

Geophagy or geophagia which is the eating of soil,(Al-Kanhal and Bani 1995; Geissler *et. al.* 1997) as well as "pica" which is defined as the eating of non –food substance such as rock powder, chalk, dirt, and other materials by humans underscores the importance of soil transmitted helminths. Pregnant women, patients with chronic kidney disease and young children (Calabresse 1989; Davies 1990) practice soil pica and ingest unusually high amounts of soil to the order of 1,000 – 5,000 mg per day (Calabresse and Stanek, 1993). Other groups that practice pica are the children aged six and younger and individuals who are developmentally delayed (Calabresse and Stanek, 1998). Geophagy is associated with cultural practices and has been recorded from traditional human societies on all continents, and is commonest among pregnant women (Diamond 1998).

As a result of the public health and socio-economic impact of soil-transmitted helminthes ova, this study was done to investigate the prevalence of soil-transmitted helminth ova from different places in Ibadan, located in the South- Western part of Nigeria.

Materials and Methods

Study Area

The study was carried out in Ibadan metropolis, located in South-Western part of Nigeria, a rainforest zone with well defined rainy and dry seasons. The immediate environment of the houses consisted of both grassy area and sandy soil seeded with animal excreta in few cases.

Sample Areas

The places covered by the study are veterinary clinics, residential areas, the zoological garden, University of Ibadan and public places along the road.

Sample Collection

A total of 670 samples were collected over a three month period, from June to August 2010. Appropriate authorities were informed and permission obtained where necessary. Samples were collected from topsoil within 5-7cm depth and at least 1.5m apart. A total of 170 samples were collected from five veterinary clinics. One hundred and fifty samples were collected from three residential areas. Two hundred samples were collected from the zoological garden and 150 from public places.

Recovery of Helminth Ova

This was done using standard floatation technique with saturated sodium chloride solution and the method proposed by Dunsmore *et al.* (1984).

Results

An overall prevalence rate of 39.6% was recorded in this survey with 265 out of 670 samples being positive for soil helminth ova. The helminth ova identified were mostly ascarids and strongyles.

Seventy five of the 170 samples from veterinary clinics were positive for helminth ova with a prevalence rate of 44.1%. Of these 75, 65 were positive for both ascarid and strongyle ova while ten were positive for only ascarid. An overall prevalence rate of 60.0% was obtained from the residential areas with 90 out of 150 samples positive for helminth ova. Forty samples from two locations were positive for strongyle ova and ten of these were also positive for ascarid ova while all 50 samples from a particular area was positive for *Ancylostoma sp.* and twenty of these were positive for ascarids. The prevalence rate at the zoological garden was 50%, these samples were positive for both ascarid and strongyle ova and majority (60 out of the 100 positive samples) were obtained close to the housing and cages of the animals. A zero percent prevalence was obtained for the 150 samples collected along the public road.

Discussion

The high prevalence of soil transmitted helminth ova in Ibadan and environment and the presence of the common duo of Ascarid and Strongyle ova is comparable with previous reports in Southern Nigeria (Wariso and Ibe, 1994; Mafiana, 1995; Adeyeba *et al.* 2002). The prevalence of Strongyle as the most common soil transmitted ova in this study and other studies in Southern Nigeria has been observed (Ogbe and Odudu, 1990; Ashaolu *et al.* 1992; Nworgu *et al.* 1998).

Strongyle eggs are very resistant to harsh environmental conditions. The favourable conditions prevailing in Ibadan may account for the ubiquitous nature of helminth ova distribution and hence very high prevalence in most if not all of the samples collected. Ascarid ova was the second most prevalent soil transmitted helminth ova in this study with a value of 27%. In a similar study, Ibidapo, (1997) reported a slightly higher prevalence of 33.3% in a cross section of soil samples while Otubanjo and Ebirikwe, (1999) reported a prevalence of 24.5% of the soil transmitted ova in the soil samples obtained from Abeokuta in Ogun State. High prevalence rate has been recorded for Strongyle ova in Lagos and other Southern Nigerian cities (Adeyeba *et al.* 2002).

The high population of dogs visiting the veterinary clinics as well as other animals may have influenced the higher prevalence rate of soil transmitted ova in these places. During the survey 100% of samples collected from a particular residence were positive for *Ancylostoma* species ova, further enquiries revealed that the place was recently vacated. The occupants had left due to disturbances by stray cats often associated with witchcraft and the fact that their children suffered 'unexplainable'

itches and rashes. The authors suspect that the children suffered from cutaneous larva migrans, a condition attributable to the larvae of *Ancylostoma* species. Presence of scavenging household animals, poor sanitation and domestic hygiene may have contributed immensely to the prevalence of Soil Transmitted Helminths (STH) ova recorded in this study. Wet environmental conditions encountered during the course of the study (June to August) might have contributed to high prevalence rates for Strongyle eggs. The survival of the eggs in the soil is favoured by optimal environmental conditions of temperature, moisture/relative humidity which is obtainable during rainfall.

Animals especially pets, dogs and cats are a common feature of many homes in southwest Nigeria which leads to continuous contamination of the environment with faeces and exposure of humans to infections. Human infections with canine and feline helminthes ranks among the most common zoonotic infection worldwide yet remain relatively unknown to public and pet owners. A low level of risk perception of zoonotic infection by dog owners in Brazil was observed by Katagiri and Oliveira-Siqueira (2008).

Globally, several efforts are being made to reduce STH infection (Montressor *et al.* 2002; WHO, 2002) and according to the WHO (2011), one of the main strategies for controlling zoonotic disease is to promote advocacy so as to emphasize their burden on society and create demand at all levels of society to control them. Regular disinfection of clinics, public places, residential environments where likelihood of stray dogs, cats and other animals are possible should be carried out in Ibadan. Also, public education on the risks associated with soil transmitted helminth infections is essential. In addition according to Stull et al. (2007) veterinarians' perception concerning animal-derived zoonoses should be improved, with emphasis on their role in disseminating information about these diseases to their clients.

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