ABSTRACT

Dogs are most popular companion animals of man since time immemorial. These animals may harbor a variety of parasites that of serious public importance. There is dearth of information regarding the role of dogs in transmission of zoonotic parasites in Nigeria and particularly in North Western (Sokoto) Nigeria. A cross sectional study was carried out in Sokoto metropolis between March and November, 2012 to determine the occurrence and prevalence of zoonotic gastrointestinal helminth parasites of household dogs. Faecal samples from 272 dogs were collected and examined using faecal sedimentation and floatation techniques. Only 196 (72.06%) dogs were positive for helminth parasite infection and the most frequently observed helminthes species (eggs) in this study were *Ancylostoma caninum* (22.33%), *Strongyle* spp (72.32%), followed by *Strongyloides stercoralis* (16.51%), *Toxocara canis* (10.68%), *uncinaria stenocephala* (8.25%) and *Taenia* spp (7.77% ). Eighty four (68.85%) of the male were positive for eggs of helminthes while 112 (74.67%) of the female dogs were positive. Dogs with single parasitic infection 39.8% (78) were more common than those with two parasitic infection 27.55% (54), three parasitic infection 11.73%(46) while 1.47%(4) dogs had more than five parasitic infections. Statistically there was no statistical significance association between sex and infection with helminth infections ($\chi^2=1.130$: P=0.1439). The present study revealed that dogs’ parasitic helminthes of zoonotic importance were highly prevalent in Nigerian household dogs. There is therefore, the need for intervention measures to reduce the risk of transmission of parasites from dog to man

**Keywords:** Dogs, Zoonotic, Helminth, Household, Prevalence, Nigeria.

**Introduction**

Dogs are the first species among the canids that adapt to human habitation all over the world. Dogs are one of the important animals in both urban and rural households; they have contributed to physical, social and emotional well-being of their owners, particularly children. Despite the useful roles of dogs to man, their close association with man pose a serious threat to public health, because dogs may harbor a range of infective stages of parasites that can be transmitted to man and other domestic animals. Some of the important zoonotic diseases transmitted by dogs to humans include cutaneous and visceral larval mignans, hydatid disease and tungiasis.

In both developed and developing countries dogs live in close proximity with humans, there are chances of zoonotic transmission of diseases especially parasitic. Zoonotic
parasites can be transmitted via direct contact with infected animals, indirect contact with secretions and excretions of animals, infected/contaminated water and food. Some of the parasites like *Enhinococcus granulosis* also involve food animals as an intermediate host and cause great economic loss through organ condemnation at the level of slaughter house.

In Nigeria and many African countries there are no existing policies regarding pet ownership and their effects on individual and community health. There are no existing data on the prevalence of zoonotic helminthes of dogs in the studies area, however, previous studies were focused on the prevalence of infection without information on the zoonotic importance of the parasites. The current study was therefore, conducted to determine the occurrence and prevalence of zoonotic helminthes of household dogs in Sokoto, Nigeria.

**Materials and methods**

**Study area**

This study was conducted in Sokoto, Nigeria which is located to the extreme northwest zone of Nigeria within the Sudan savannah between longitude 4° 8' E and 6° 54' E and between latitude 12° N and 13° 58' N. Base on the year 2006 population and housing census, Sokoto state has a projected population of about 3,696,999 people. The study sites were purposively selected because of the dog’s population. These sites are Arkilla, Runiji Sambo, Bado, Sokoto Cinema Area, Hajiya Halima Area, Mabera, Anguwa Rogo, Old Airport and Kwannawa Areas of the metropolis.

**Sampling and Parasitological Techniques**

The study was a cross sectional type where data are collected at single point and time. The households were randomly selected from the selected sites. Faecal samples were collect per-rectum and freshly voided faced material were also collected from floors and transferred into a labeled container in an ice pack and transported the veterinary parasitology laboratory of Usmanu Danfodiyo University Sokoto, where the samples were immediately processed or stored at refrigeration temperature (4°C) for not more than 24hrs. The samples were processed using the sedimentation and floatation techniques.

**Statistical Analysis**

The data obtained from the study were analyzed by using Graphpad Instat 3.06 statistical software. Generated descriptive statistics were presented as tables. The prevalence (p) of infection was determined by dividing the number of dogs harboring helminth parasites by the total number of dogs examined. Chi-square test was used to assess association between
infections and sex. Statistical analyses were considered significant at $p<0.05$ and confidence level was held at 95%.

**Results**

A total of 272 dogs’ faecal samples were examined, out of which 196 (72.06%) were positive for helminth parasites eggs (Table I). The most frequently observed helminthes species (eggs) in this study were *Ancylostoma caninum* (22.33%), *Strongyle* spp (22.33%), followed by *Strongyloides stercoralis* (16.51%), *Toxocara canis* (10.68%), *Uncinaria stenocephala* (8.75%) and *Taenia* spp (7.77%) (Table II).

Out of the 272 dogs sampled, 122 (44.85%) were male and 150 (55.15%) were female (Table III). A total of 84 (68.85%) of the males were positive for eggs of helminthes while 112 (74.67%) of the female dogs were positive. There are faecal samples that revealed more than one helminth eggs; However, dogs with single parasitic infection 39.8% (78) were more common than those with two parasitic infection 27.55% (54), three parasitic infection 23.47% (46) while 2.04% (4) dogs had more than five parasitic infections (Table IV).

Statistically there was no statistical significance association between sex and infection with helminth infections ($\chi^2=1.130: P=0.1439$).

**Table I Prevalence of Dogs Intestinal Helminths**

<table>
<thead>
<tr>
<th>No. of Samples</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive sample</td>
<td>196</td>
</tr>
<tr>
<td>Negative sample</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td>272</td>
</tr>
</tbody>
</table>

**Table II: Species distribution of helminth parasites of dogs.**

<table>
<thead>
<tr>
<th>Helminth eggs</th>
<th>No. of dogs affected</th>
<th>Detection rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Strongyle</em> spp</td>
<td>46</td>
<td>22.33</td>
</tr>
<tr>
<td><em>A. Caninum</em></td>
<td>46</td>
<td>22.33</td>
</tr>
<tr>
<td><em>T. canis</em></td>
<td>22</td>
<td>10.68</td>
</tr>
<tr>
<td><em>E. granulosus</em></td>
<td>7</td>
<td>3.40</td>
</tr>
<tr>
<td><em>Taenia</em> spp</td>
<td>16</td>
<td>7.77</td>
</tr>
<tr>
<td><em>D. caninum</em></td>
<td>12</td>
<td>5.83</td>
</tr>
<tr>
<td><em>Trichurus Vulpis</em></td>
<td>1</td>
<td>0.48</td>
</tr>
<tr>
<td><em>Spirocerca lupi</em></td>
<td>3</td>
<td>1.46</td>
</tr>
<tr>
<td><em>T. Leonina</em></td>
<td>1</td>
<td>0.48</td>
</tr>
<tr>
<td><em>Strongyloides stercoralis</em></td>
<td>34</td>
<td>16.51</td>
</tr>
<tr>
<td><em>Uncinaria stenocephala</em></td>
<td>17</td>
<td>8.75</td>
</tr>
<tr>
<td><em>Toxascaris</em> spp</td>
<td>1</td>
<td>0.48</td>
</tr>
<tr>
<td>Total</td>
<td>206</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table III: prevalence of different helminthes of dogs by sex**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Positive samples</th>
<th>Negative samples</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>84 (68.85%)</td>
<td>38 (31.15%)</td>
<td>122 (44.85%)</td>
</tr>
<tr>
<td>Female</td>
<td>112 (74.67%)</td>
<td>38 (25.33%)</td>
<td>150 (55.15%)</td>
</tr>
<tr>
<td>Total</td>
<td>169 (72.06%)</td>
<td>74 (27.94%)</td>
<td>272 (100.00%)</td>
</tr>
</tbody>
</table>

$\chi^2=1.130: P=0.1439$

**Table IV: Prevalence of single and mixed helminth infections in dogs**

<table>
<thead>
<tr>
<th>Type of infection</th>
<th>No. of Dogs</th>
<th>Infection rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>78</td>
<td>39.80%</td>
</tr>
<tr>
<td>Two</td>
<td>54</td>
<td>27.55%</td>
</tr>
</tbody>
</table>

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Three  46  23.47%
Four    8   4.08%
Five     6   3.06%
More than Five  4  2.04%
Total   196  100%

Discussion

The study has demonstrated that gastrointestinal helminth parasites prevailed in house hold dogs in Sokoto Metropolis Nigeria. Eggs of different species of helminthes (nematodes and cestodes) were demonstrated in this study. Similar observations were made by previous studies in Tanzania, Ethiopia and in Nigeria.

The overall prevalence of gastrointestinal helminthes (72.06%) was similar to that reported by Mahmuda and that from different ecological and epidemiological settings in Nigeria.

In Ethiopia (64.4%), Tanzania (59.3%), south Africa (76%), Moroaco (100%) prevalence were reported. In contrast similar study conducted in developed countries, very low prevalence were reported in Netherlands, Belgium and UK. The differences could be associated with a higher level of awareness of dog parasites among dog owners and their socioeconomic status in developed countries compared to developing countries.

Demographic Factors, geographical location, diagnostic technique, the regular use of anthelmintics may also be responsible for the wide variance in prevalence. All the helminth parasites detected in this study are of serious public health significance. This potential for human zoonotic disease has rarely been addressed in control programs in Nigeria and other low income countries. The high prevalence of intestinal helminth infections found in dogs, and the close association in which dogs live together with people, the risk of transmission of these parasites to humans seems to be obvious. The overall parasitic prevalence between male and female revealed no statistical significance association. This observation was similar to reports of similar study.

The common species of zoonotic helminthes parasite observed in this study was A. caninum (22.33%), this is in agreement with other similar studies in Nigeria, Ethiopia, Tanzania. Other zoonotic helminths detected in this study include T. canis, Taenia sp, Diphylidium caninum, E. granulosus, Trichuris vidpis, spirocerca lupi and Toxocara leonina.

There was no statistical significance difference between the male and female dogs in terms of detection rate.

The number of gastrointestinal helminth species per host shows that single helminth infection was more common, poly-parasitism with more than three helminth species was less frequently observed. A similar pattern was observed by. These observations are in agreement with report of who explained that interactions among parasitic species depend on parasite burden rather than the mere presence of other species.

Conclusion

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The present study revealed that dogs’ parasitic helminthes of zoonotic importance were highly prevalent in Nigerian household dogs. There is therefore, the need for intervention measures to reduce the risk of transmission of parasites from dog to man. Intervention measures such as public education to create awareness on the zoonotic potential of the helminthes, mode of transmission, and the need for regular visits to veterinary clinics for deworming/treatment of dogs.

REFERENCES


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