**AHC -22**

# Prevalence of Parasites among Dogs Undergoing Treatment at Polo Veterinary Clinic Jos, North Central Nigeria

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## Abstract
Dogs roaming about are susceptible to parasites infestation and infection. Therefore, this study examined the prevalence of parasites among dogs undergoing treatment at Polo Veterinary Clinic Jos, North Central Nigeria between November, 2016 and April, 2017. The standard protocol for examination of parasites infection (blood and stool samples) and infestation was used. Of the 639 dogs examined only 82 (12.8%) were infected while 557 (87.2%) were uninfected. Therefore, difference highly varied ($p<0.001$). The three parasites recorded were protozoans, helminthesand arthropod groups. Protozoan's infection across gender showed no significant variation ($p>0.05$) but varied significantly across age groups ($p<0.05$). However, the prevalence of helminth parasitesin relation to age groups did not vary ($p>0.05$). Arthropod prevalence in relation to age groups varied significantly ($P < 0.05$). The Alsatian breed is highly susceptible to arthropod infestation, protozoans and helminthes infections. To this end, some dogs had co-infections or mixed infections. Therefore, dogs allowed to roam by owners should be cleaned and dewormed over an interval of time and their cages be kept clean.

**Keywords:** Parasites, dogs, Jos.

## Introduction
Domesticated dogs are everywhere within the society for various reasons some including hunting, security or companionship. While some of these dogs are kept on a short leash others are allowed to roam making them susceptible to arthropod (ectoparasites) infestation (Ugbomoiko *et al.,* 2008) and endoparasites/ ectoparasites infection (Morand *et al.,* 2014). Endoparasites include Intestinal parasites that live in the small and large intestines of their hosts and they include many of the helminthes and the protozoans (Elom *et al.,* 2015). Ectoparasites include lice (Anoplura), fleas (Siphonoptera), louse (Hippoboscidae), bed bugs (Hemiptera) and ticks. These ectoparasites constitute over 80%of all known animal species occupy almost every known habitat, as well as a plethora of small and little-known groups cause severe dermatitis or act asvectors of various microorganisms which are pathogenin domestic dogs, other animals and humans (WHO, 1984; Ganiere *et al.,* 2001; Shaw *et al.,* 2001 and Dagnone *et al.,* 2003).

Series of studies on the ectoparasites of domestic dogs have been documented in Nigeria. Chukwu (1985) reported that 2.1% of dogs had *Echidnophaga gallinacean* while 26.3%had*Ctenocephalidescanis*in Eastern Nigeria. According to Jame-Rugu and Iwuala (2002) 65.7% of dogs had ticks including *Rhipicephalus sanguineus*, *Boophilus decoloratus*, *Haemophysalis leachii* and *Amblyomma lepidum*, while28.3% were infested with fleas which were *C. canis* and *Xenopsylla cheopis* in the Jos Plateau State North Central Nigeria.

Information about the endoparasites and ectoparasites infesting dogs is critical for planning, implementation and evaluation of an effective control strategy; against this backdrop, this study was aimed at identifying and evaluating the endoparasites and ectoparasites infesting dogs undergoing treatment at Polo Veterinary Clinic, Jos Plateau State, Nigeria in relation to their gender, breed and age groups of dogs.

## Materials and Methods
The study was carried out at Polo Veterinary Clinic Jos situated in the Northern part of Plateau State (08˚24´N and 008˚32´E). The clinic is a referral clinic where people take their animals for examination and treatments. Dogs brought to the clinic are from Jos environs.

Daily examination of dogs was done except during the weekend from the month of November, 2016 to April, 2017. Dogs were categorized as young (1-6 months old), adolescent (7 months – 1 year) and adult (1 year and above) respectively. Before examining the animals, the tape muzzle was used to chain the animals before samples were taken. Physical examinations of dogs were carried out for ectoparasites by direct collection in relation to predilection sites as described byJames-Rugu and Iduh (1994) and Nelder and Reeves (2005) in which specimens were transferred into labeled bottles containing 70% ethanol and taken to the laboratory foridentification using identification keys by Smith (1996), John (2001), Holly (2003) and Nelder and Reeves (2005), while blood and stool samples were collected for endoparasites infections. Ectoparasitescollected from each dog were. In the, the specimens from each dog were identified, counted and recorded according to body regions.

Blood processing protocol used for haemoparasites identification was as described by Kamani *et al.* (2010). Labelled sterile plastic bottles were used for each dog for the collection of their stool samples. Each stool sample, after collection was examined microscopically using wet mount preparation for intestinal helminths. The glass slide was labelled using a marker after which a drop of normal saline was placed on the centre of the slide. A portion of the stool sample was picked up with an applicator stick and mixed with the drop of normal saline. A cover slip was placed over the preparation and the observed with a microscope.

Data obtained were analysed using RConsole software (version 3.2.2). Pearson's Chi-square test was used to compare the proportion of the prevalence rate of parasitic infections in relation to gender, breed and age groups respectively. The p-values < 0.05 were considered statistically significant.

**Results and Discussion**

Out of the 639 dogs sampled, only 82 (12.8%) were infected while 557 (87.2%) were uninfected. Therefore, the prevalence rate of parasites between uninfected and infected dogs showed a very high significant difference ($\chi^2$= 353.09, df = 1, p<0.0001). This agrees with Elom *et al.* (2015) who concluded that parasites prevalence in dogs was very high. Table 1 shows that females 38 (13.33%) were more infected with protozoans than males 44 (12.43%). However, there was no significant difference ($\chi^2$= 0.048681, df = 1, p = 0.8254) in the prevalence of protozoan infection in relation to gender. This is not in agreement with the finding of Elom *et al.* (2015) who observed that female dogs were more infected with protozoan infection than males. Both males and females were mostly infected with piroplasmosis followed by canine babesiosis and the least infected was only one dog that had co-infection of canine babesiosis and piroplasmosis.

Alsatian breed was mostly infected by protozoans 2 (50%) then followed by Caucasian 22 (26.83%) and Neopolitan breed had no protozoan parasite 0 (0%). Therefore, the prevalence of protozoan infection in relation to the breed of dogs showed a highly significant difference ($\chi^2$= 21.676, df = 5, P = 0.0006033). Dogs aged 1-6 months had the highest protozoan infection 49 (10.72%) while age 19-24 months were not infected 0 (0%). Hence, protozoan infection in relation to age groups showed a significant difference ($\chi^2$= 12. 733, df = 5, P = 0.02602). This possibly suggests that their blood is nutritious. On the contrary, Anberbir and Mersha (2011) showed that parasites infect dogs of any age. Also, Elom *et al.* (2015) observed that dogs older than1 year of age were more infected. Males had more helminth infection 22 (6.21%) than females 15 (5.20%). However, there was no significant difference ($\chi^2$= 0.11665, df = 1, P = 0.7327) in the prevalence of helminths infection in relation to gender. Helminths infection was highest in Alsatian breed 1 (25%), while Neopolitan and Crossed breeds respectively were uninfected 0 (0%). Therefore, helminths infection in relation to dog breeds showed a significant difference ($\chi^2$= 12. 35, df = 5, P = 0.03029).Dogs aged 13-18 months were more infected 3 (7.89%) with helminths while those aged 19-24 months were not infected 0 (0%). However, helminths infection in relation to age groups showed no significant difference ($\chi^2$= 1.6965, df = 5, P = 0.8893).

Table 1: Prevalence of protozoan infection in relation to gender, breed and age groups of dogs

| Dog Characteristic | | No. observed | Protozoan infection No. (%) infected | | | Total No. (%) infected |
|---|---|---|---|---|---|---|
| | | | Canine Babesiosis (%) | Piroplasmosis (%) | Canine Babesiosis/ Piroplasmosis (%) | |
| Gender | | | | | | |
| | Male | 354 | 12(3.39) | 31(8.76) | 1(0.28) | 44 (12.43) |
| | Female | 285 | 11(3.86) | 27(9.47) | 0(0.00) | 38 (13.33) |
| Breed | | | | | | |
| | Mongrel | 445 | 14(3.15) | 17(3.82) | 4 (0.90) | 35 (7.87) |
| | Caucasian | 82 | 8 (9.76) | 14 (17.07) | 0(0.00) | 22 (26.83) |
| | Alsatian | 4 | 2 (50.00) | 0(0.00) | 0(0.00) | 2 (50.00) |
| | Neapolitan | 8 | 0(0.00) | 0(0.00) | 0(0.00) | 0 (0.00) |
| | Crossed | 56 | 10 (17.85) | 8(14.29) | 0(0.00) | 18 (32.14) |
| | Others | 44 | 0(0.00) | 5(11.36) | 0(0.00) | 5 (11.36) |
| Age-group | | | | | | |
| | < 1 month | 14 | 0(0.00) | 1(7.14) | 0(0.00) | 1 (7.14) |
| | 1-6 months | 457 | 14(3.06) | 35(7.66) | 0(0.00) | 49 (10.72) |
| | 7-12 months | 38 | 4(10.53) | 6(15.79) | 0(0.00) | 10 (26.32) |
| | 13-18 months | 38 | 1(2.63) | 7(18.42) | 0(0.00) | 8 (21.10) |
| | 19-24 months | 7 | 0(0.00) | 0(0.00) | 0(0.00) | 0 (0.00) |
| | >24 months | 85 | 4(4.71) | 9(10.59) | 1(1.18) | 14 (16.47) |

The prevalence of arthropod infection was high in males 41 (11.58%) and low in females 25 (8.77%). However, there was no significant difference ($\chi^2$= 0.38801, df = 1, P = 0.5333) in the prevalence of arthropod infection between gender. Alsatian breed had the highest arthropod infection 1 (25%) while Neopolitan had no infection. Therefore, there was veryhigh significant difference ($\chi^2$= 29.337, df = 5, P < 0.001) in the prevalence of arthropod infection in relation to dog breeds. Presence of arthropod was highest in dogs < 1 month of age 7 (50%) and the least infected were age groups 7-12 months and 13-18 months respectively 3 (7.89%). Therefore, the prevalence of arthropod infection in relation to age groups showed a very high significant difference ($\chi^2$= 86.29, df = 5, P < 0.001). This possibly suggests very poor hygiene in cages and environs where these dogs are kept (Tolera and Berhanu, 2015). Arthropod and helminthes co-infections prevalence in dogs was highest in the helminthosis/myiasis category 11 (1.72%) while helminthosis/ascariosis category was least 2 (0.31%). However, there was no significant difference ($\chi^2$=1.2326, df = 2, P = 0.54) between the prevalence of arthropod and helminthes co-infections categories.

**Conclusion and Recommendations**

The high prevalence of parasitic infections in the dogs examined in this study calls for drastic action in order to avoid a decline in dog's population. Therefore, dogs in Jos and environs should be examined weekly for parasites so as to effectively keep them fit and free from parasites infection and infestation. Owners of dogs should maintain high sanitary condition of their dog's cages and environs.

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