

Prevalence of *Zoonotic Gastrointestinal Helminth Parasites* (ZGIHP) of Dogs Presented to the Small Animal Clinic of the Veterinary Teaching Hospital, University of Agriculture, Makurdi, Benue State (October 2016-January 2017)

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Abstract: Dogs are the most common pet animals worldwide and have been reported to be hosts of many intestinal parasites of zoonotic importance globally. In Nigeria, gastrointestinal helminthes of dogs is currently endemic in 20 of the 36 states including Benue state. Out of 97 samples analysed 32 (32.99%) were positive of at least one of the parasites over a period of 4 months (October 2016 - January 2017). There was higher occurrence of single infection 28(87.5%) than concurrent mixed infections 4(12.5%). The Helminth parasites recovered from dog's faeces were *Ancylostoma caninum* 30(30.93%) and *Dipylidium caninum* 6 (6.12%). There was no significant difference in prevalence with respect to age (P=0.300), breed (P=0.137), sex (P=0.538), month (P=0.443) and location (P=0.540). However, there was higher prevalence in young, local, male dogs. This study showed that there is high prevalence of ZGIHP of dogs in Makurdi. This can be a potential source of infection to other healthy dogs and humans. There is a need to continuously carry out public enlightenment campaign on the dangers of infection with helminthes by the appropriate agencies. A wider study should be carried out for a longer period to cover all seasons and possible dog ownership in the city.

Keywords: Helminths, Prevalence, Faecal samples, Makurdi, Nigeria.

I. Introduction

Zoonotic infections are infections of animals that are naturally transmissible to humans. As such they are worldwide and often spread to humans through their companion and domestic animals [1]. These diseases are receiving increasing attention from international community, as they account for 75% of newly emerging infectious diseases [2].

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Parasitism is the most encountered disease in dogs all over the world [3]. Where studies have been conducted, parasitic gastro-intestinal helminthes and protozoa have been identified as the major impediment to dog health worldwide owing to the direct and indirect losses they cause [4]. In addition, dogs are routinely infected with intestinal parasites, sometimes without apparent evidence of the infection until it is too late. This means that a dog can have internal parasites even though the faecal sample is negative, thus causing a health risk to humans [5].

The population of dogs as the most common pet and sentinel animal globally has been on a steady increase [6]. In areas of high population density such as urban and peri-urban, dog keeping practises may also be a risk to the transmission of zoonoses[7]. The major risk factors affecting epidemiology of helminthosis and other gastro-intestinal tract parasites can be classified broadly as parasite factors, host factors and environmental factors [8].

The transmission of zoonotic agents could be through direct contact with the animal, through indirect contact with animal secretions, excretions and infected water or food [9]. Many pet gastro-intestinal parasites eliminate their dispersion elements i.e egg or larvae by the faecal route [7].

Makurdi, the capital of Benue state Nigeria, is fast becoming a metropolitan centre with attendant health, social, housing and environmental problems. Dogs frequently roam and defaecate freely contaminating the environment with zoonotic parasites, a potential health hazard to the inhabitants. With an estimated population of three thousand, three hundred and twenty two street dogs and seven thousand five hundred owned dogs in Makurdi[10]. There is need therefore to carry out prevalence study of these parasites in dogs. This will enable health agencies to institute and evaluate control measures in order to control potential human infections.

II. Material and Methods

The study was conducted in the small animal Clinic of the Veterinary Teaching Hospital, University of Agriculture, Makurdi (VTHUAM) from October 2016 to January 2017. The town lies between latitude $7^{\circ}15^1 - 7^{\circ}45^1$ N and longitude $8^{\circ}15^1 - 8^{\circ}40^1$ E. The town lies in the guinea savannah vegetative belt and in the bank of the second largest river in Nigeria, River Benue. The river divides the town into north and south banks and the town covers an area of 16 km^2 . Makurdi has an altitude of 104 metres with an annual rainfall of about 1237 mm and mean annual temperature of 27.6°C . It has a tropical wet and dry/savannah climate with a pronounced dry season in the low-sun months (Dec – March), no cold season, wet season in the high-sun months (April – Nov). Makurdi has an estimated population of 279,398 inhabitants according to 2006 population census with a projection of 348,990 at 2011 [11] with an average number of dogs per household at 1.43 [12].

Sample Collection

With the permission and assistance of the owners, faecal samples were collected from all the dogs presented to the Small Animal Clinic of the VTHUAM. Samples were collected directly from the rectum of the animals using a gloved hand and taken immediately to the Veterinary Parasitology Laboratory of VTHUAM for examination. Data with regard to breed, age, sex, location and date of sample collection was recorded for each animal that was sampled.

LABORATORY PROCEDURE

All faecal samples were examined on the same day of collection. Samples were initially examined microscopically for adult worms and proglottids. The presence of zoonotic helminthes infection was confirmed by simple floatation technique. Sodium chloride solution (0.18-0.2 SG) was used as flotation fluid and identification of eggs was made on the basis of their morphology using keys given by [13]. The preparation of a sample for simple flotation requires suspending 1 g of faeces in 15 ml of flotation solution, straining that slurry through a sieve, and then pouring the strained fluid into a test tube. A coverslip was placed on top of the surface of the liquid and the tube and cover slip allowed to stand for another five minutes so that the eggs can passively float to the top of the solution. The coverslip was removed and placed on a clean glass slide for examination on a light microscope(x10) for the presence of helminths eggs [14].

III. Results

A total of 97 faecal samples were collected. Of these, zoonotic gastro-intestinal helminths parasites were detected in 32(32.99%). Dogs with more than one species of the helminthes were taken as one positive case. There was higher occurrence of single infection 28(87.5%) than concurrent mixed infection 4(12.5%). The Helminth parasites recovered from the faecal samples were *Ancylostoma caninum* 30 (30.93%) and *Dipylidium caninum* 6 (6.12%). Age specific prevalence rates were 38.18% for dogs between 0-11 months, 21.43% for dogs between 1-4 years and 35.71% for dogs above four years. Breed specific prevalence rates were 43.18% for local dogs, 16.67% for cross breed and 25.53% for the exotic breed of dogs. Sex specific prevalence rates were 34.72% for male dogs and 28.00% for the female dogs. Monthly distribution of prevalence rates were 34.78% in October, 47.06% in November, 25.00% in December and 31.03% in January. Gastro-intestinal Helminth parasites from dogs in different parts of Makurdi shows 36.73% in North bank, 30.00% in Wurukum, 42.86% in Modern market, 0.00% in Wadata and 28.57% in High level

Table 1: Age, breed and sex specific prevalence rates of zoonotic gastro-intestinal helminth parasites of dogs presented to the small animal clinic of the VTHUAM (October 2016 – January 2017)

		Number examined	Positive	Prevalence (%)	Chi ²	P
Age	0-1	55	21	38.18	2.4106	0.300
	1-4	28	6	21.43		
	>4	14	5	35.71		
Breed	Local	44	19	43.18	3.9732	0.137
	Crossed	6	1	16.67		
	Exotic	47	12	25.53		
Sex	Male	72	25	34.72	0.3793	0.538
	Female	25	7	28.00		

Table 2: Monthly specific and location distribution prevalence rates of zoonotic gastro-intestinal helminth parasites of dogs presented to the small animal clinic of the VTHUAM (October 2016 – January 2017).

		Number examined	Positive	Prevalence (%)	Chi ²	P
Monthly	October	23	8	34.78	2.6852	0.443
	November	17	8	47.06		
	December	28	7	25.00		
	January	29	9	31.03		
	North bank	49	18	36.73		

Location	Wurukum	30	9	30.00		
	Modern Market	7	3	42.86	3.1082	0.540
	Wadata	4	0	00.00		
	High level	7	2	28.57		

IV. Discussion

The study revealed a high level of infection with zoonotic gastrointestinal helminths (ZGIHP) in dogs presented to VTHUAM. This agrees with previous works in Nigeria with similar high prevalence [15, 16,17]. These findings affirm the potential environmental contamination with faeces of dogs which raises public health concern and constitutes health hazard to human population. The study like other previous studies [18, 19] has also shown more parasite eggs of *Ancylostoma caninum*. This could be due to the numerous modes of transmission of the parasite and better environmental factors that favour survival. The presence of high quantities of parasites eggs of dogs presented to the VTHUAM is a pointer that they are readily available sources of infection of these parasites to humans in the study area.

There was no significant difference in the prevalence of ZGIHP with respect to age ($P=0.300$). Although dogs below one year of age were more infected (38.18%) and it decreased as the dog aged. The higher prevalence in young dogs as compared to older dogs agrees with [20]. This high prevalence could be as a result of the transmammary route of infection and age-acquired dependent immunity may be caused by repeated exposure [21]. The decrease on older dogs may be due to specific immune response to the parasite exposed to the dogs at early ages [22].

With respect to breeds, there was also no significant difference in the prevalence of ZGIHP ($P=0.137$). The higher prevalence noted in local breeds (43.18%) may be due to their scavenging habits which increases their risk of acquiring the parasites from the environment. The crossed and exotic breeds which may be less immune are usually more treasured and restricted by their owners and therefore less prone to infection. This agrees with [23] who posits that the degree of care shown to pets is closely related to their owners and on the breed of pet.

The study revealed no statistically significant difference ($P=0.538$) in the frequency of ZGIHP of dogs between male and female dogs. This finding agrees with [24, 25]. However, the higher prevalence observed in male dogs (34.72%) agrees with [26] and this may be due to the more scavenging and hunting nature of male dogs.

With respect to locations sampled, Modern market (42.86%) and North bank (36.73%) had higher prevalence than High level (28.57%) and Wurukum (30.00%), however, this difference was not statistically significant ($P=0.54$). The higher prevalence in the first two locations could be as a result of the high disparity in numbers of samples collected from these two places.

V. Conclusion

The high prevalence recorded in this study calls for a sustained control and preventive efforts to minimise the worm burden in these animals. Considering the fact that these are owned dogs presented to the clinic rather than the unowned/free roaming dogs with much higher risk of infection with ZGIHP. Parasites infections are known to be a hazard for people exposed to contaminated environment. This poses a considerable potential risk of transmission to humans in the study area. It is therefore important that dog owners take their dogs to Veterinary clinics for routine check up. Public enlightenment campaign should be carried out by appropriate agencies on the risk associated with environmental contamination with helminths eggs of dogs.

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