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Prevalence of canine babesiosis and ticks infestation in Umuahia North Area of Abia State.

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Abstract

A cross sectional study of dogs in Umuahia North area of Abia State, with the objective of determining the prevalence of canine babesiosis and tick infestation was undertaken. A total of 110 dogs were randomly selected comprising of 36 dogs categorized as young (less than 1year old) and 74 dogs as adults above 1year old. 42 male and 68 female dogs were sampled. 81 local and 29 exotic breeds were screened. Blood sample and handpicking of ticks obtained from dogs of various ages, sexes, and breeds were analyzed in the laboratory using standard techniques. The results of the frequency of infection were calculated and presented as percentages. Three different types of parasites were found to infect dogs in Umuahia North LGA of Abia State, namely: Babesia spp (16.3%), Rhipicephalus spp (45.0%) and Haemaphysalis spp (15.0%). The occurrence of the various parasites was higher in females, adults and local breeds of dogs when compared with male, young and exotic breeds of dogs. These parasites are capable of causing considerable loss in dog breeding and can cause infection in humans. Therefore, dog owners in the study area should be sensitized on the dog health programmes and measures to reduce the incidence of Babesia and tick-borne diseases.

Keywords: Abia State, Babesia, ticks borne vector, Prevalence.

Introduction

The domestic dog (*Canis familiaris*) is the most widely distributed carnivorous species globally (Thalmann et al., 2013). Its domestication and selective breeding over other animals have been largely driven by its exceptional behavioural, sensory, and physical traits (Perri, 2016). The dog's extraordinary success as a companion animal is underpinned by unique adaptations that facilitate cohabitation with humans (Wynne, 2021). Notably, dogs have made significant contributions to the physical, social, and emotional development of children, as well as to the overall well-being of their owners, across both developed and developing nations (Purewal et al., 2017).

Globally, dogs have been reported to harbor a variety of haemoparasites, including species of *Babesia*, which are primarily transmitted by ticks and are responsible for considerable morbidity and mortality (Otranto et al., 2009). The ongoing geographic spread of tick vectors, exacerbated by climate change and the increased mobility of humans and their pets, has heightened the vulnerability of dogs to tick-borne infections (Gray et al., 2009).

Canine babesiosis, caused by protozoan parasites of the genus *Babesia*, is a tick-borne disease of global significance (Irwin, 2005). Transmission may occur via tick bites, direct blood contact through dog fights, transfusions, or even transplacentally (Okoli et al., 2006). The prevalence of canine babesiosis varies geographically within Nigeria. For instance, Oduye and Dipeolu (1976) reported a prevalence of 53% in Ibadan, Saror et al. (1979) observed a prevalence of 22% in Zaria, while Odewunmi and Uzoukwu (1979) reported a prevalence of 55.1% in Enugu.

Given the increasing dog population and the high incidence of tick infestation cases reported in veterinary clinics across Umuahia North Local Government Area, this study was undertaken to investigate the prevalence of *Babesia* infection in dogs and to determine its possible correlation with tick infestation.

Materials and Method

Study area:

The study was conducted in Umuahia North local government area of Abia State, Nigeria, and lies within longitude 7 29'40.60" E latitude 5 31' 29.68''N. Umuahia North has an

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area of 140km and a population of 324,900 according to the 2006 National population census estimation (NPC, 2007).

Study population

Blood samples were collected from 110 apparently healthy and asymptomatic dogs in randomly selected households in Umuahia North area. The study was carried out between the months of September and December, 2024. Their ages, sexes, breed and ticks infestation were recorded.

Collection and Examination of blood

2ml blood sample were collected aseptically using disposable syringes from the cephalic vein of each dog into heparinized tubes and sent to the Vet. Parasitology and Entomology laboratory of Michael Okpara University of Agriculture, Umudike for examination and identification.

Thin blood smear was prepared from each blood sample, fixed in methanol for 3-5mins and stained with Giemsa-wright solution. After staining the smears were washed with phosphate buffered saline (PBS) to remove excess stains. The slides were then air dried and examined under oil immersion (x100) lens for *Babesia* as described by Cheesbrough (2009).

Ticks were confirmed to be present by handpicking or removed with a pair of forceps and placing them into plain sterile sample bottles containing 70% alcohol. Ticks were displayed on a petri dish, examined using a magnifying hand lens and identified using morphological features as described by Wall and Shearer (2008).

Statistical analysis

The data collected were analysed using descriptive statistics as described by Swai (2010). The prevalence (P) of the various parasites in different age, sexes and breed were calculated and presented in tables using the formula P=d/n. where d is number of positive samples analysed at that point in time, and n = total number of dogs sample analysed at that point in time (Thrusfield,2005). The prevalence was calculated in percentage.

Results

A total of 110 dogs were screened for both *Babesia* organism and ectoparasites (Table 1). Thus, the prevalence of *Babesia* species and ectoparasites of dogs observed in this study were *Babesia* spp (16.3%), *Rhipicephalus* spp, (45.0%) and *Haemaphysalis* spp (15.0%).

The prevalence of *Babesia* spp in Table 2 was higher in adult dogs (51.3%) than in young dogs (31.0%). The Prevalence in Female (53.0%) was higher when compared to males (31.0%). The prevalence was higher in local breed (65.4%) when compared to the exotic breed (10.3%).

The prevalence of *Rhipicephalus* spp in Table 3 was higher in adult dogs (41.0%) than in young dogs (25.0%). The prevalence in female (37.0%) was higher when compared to males (29.0%). The prevalence was higher in local breed (59.2%) when compared to the exotic breed (14.0%).

The prevalence of *Haemaphysalis* spp in Table 4 was higher in adult dogs (22.0%) than in young dogs (14.0%) . The prevalence in female (26.4%) was slightly higher than in male (24.0%). The prevalence was higher in local breed (38.2%) when compared to the exotic breed (7.0%).

Table 1: Prevalence of different species of parasites from sampled dogs in Umuahia North.

Parasite type	Number examined	frequency of infection	Prevalence (%)
Babesia	110	18	16.3
Rhipicephalus	110	49	45.0
Haemaphysalis	110	17	15.0

Table 2: Prevalence of *babesia* spp in each category of dogs sampled

Population type	number examined	number infected	prevalence (%)
Young	36	11	31.0
Adult	74	38	51.3
Male	42	13	31.0
Female	68	36	53.0
Local breed	81	53	65.4
Exotic breed	29	3	10.3

Table 3: Prevalence of *Rhicephalus* spp in each category of dogs sampled

Population type	number examined	number infected	Prevalence (%)
Young	36	9	25.0
Adult	74	30	41.0
Male	42	12	29.0
Female	68	25	37.0
Local breed	81	48	59.2
Exotic breed	29	4	14.0

Table 4: Prevalence of *Haemaphysalis* spp in each category of dogs sampled

Population type	number examined	number infected	Prevalence (%)

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Young	36	5	14.0
Adult	74	16	22.0
Male	42	10	24.0
Female	68	18	26.4
Local breed	81	31	38.2
Exotic breed	29	2	7.0

Discussion

Babesia infection is highly pathogenic and is the major cause of haemolytic anaemia in dogs in the tropics (Kamani *et al*.,2011). *Babesia* is among the most widely distributed haemoparasites of dogs occurring in almost anywhere the tick vector *Rhipicephalus sanguineus* is reported (Taylor *et al*.,2007). The present study shows an 16.3% of *Babesia canis* in dogs in Umuahia North area of Abia state. This result is similar to the earlier studies of Obeta *et al*., (2009) which recorded 11.66% prevalence of haemoparasites of dogs in the Federal Capital Territory, Abuja. Also, it was similar to the study carried out in Makurdi by Amuta *et al*., (2010) which recorded 10.2% infection rate. In contrast, Ifeoma, 2013 reported a higher prevalence of 59.3% in dogs attending ECWA Veterinary Clinic in Jos, Nigeria. Also (Adamu *et al*.,2014) reported a higher prevalence of 53.0% among dogs in Plateau State Nigeria. The variable prevalence rates reported from different parts of the country might be as a result of different ecology which affects the population of tick vectors and hence the presence of the haemoparasites they transmit.

The most prevalent ectoparasite species recorded was *Rhipicephalus* spp (45.0%) while *Haemaphysalis* spp was (15.0%). These results corroborated the finding of Elom *et al*., (2015) who reported *Rhipicephalus* spp as the most abundant tick in two local government area (Ikwo and Ezza) of Ebonyi State, Nigeria. Similarly, Troyo *et al*., (2012) and Adamu *et al*., (2014) reported *Rhipicephalus* spp as the most abundant ectoparasite in slaughtered dogs in Maiduguri, Nigeria. Several studies have attributed the abundance of *Rhipicephalus* spp to suitable environmental factors, high temperature, rainfall and humidity (Okoli *et al*., 2016, Muhanguzi,*et al*.,2020).

The prevalence rate of *Babesia* infection and ticks infestation was significantly higher among adult dogs (51.3%) than puppies (31.0%).This result was in agreement with Obeta *et al*.,(2009) that recorded higher prevalence of blood parasites among older dogs than puppies, but in contrast to the reports of Okubanjo *et al*.,(2013) and Konto *et al*.,(2014) who reported a higher prevalence in puppies than in adult dogs. The reason for higher tick infestation among adult dogs in this study might be due to adult dogs being more mobile and likely to come more in contact with tick infected areas, which could also lower their immunity (Egege *et al*., 2008).

The infection rates of *Babesia* among sex showed that female had higher prevalence (53.0%) than their male counterpart (31.0%). This was in agreement to the findings of Obeta *et al*., (2009), Aldemir (2007), and Tadesse *et al*., (2019) that found higher prevalence in female dogs than in male dogs in various studies in Turkey and Ethiopia respectively. This was attributed to physiological changes in the female due to pregnancy and lactation which tend to lower host immune system but differs with findings of (Omudu *et al*., 2012) who reported that sex generally does not play a major role in susceptibility to parasitic infections in dogs. However, a study carried out in South Africa showed that babesiosis occur more in male dogs than in female (Mellanby *et al*., 2011).This could be as a result of frequent roaming of male dogs in search of mates and establishing territories thereby, picking the vectors.

Higher prevalence of babesiosis and ectoparasite infestation was recorded in local dogs (65.4%) than in exotic breeds (10.3%). This result was in agreement with the study carried out in Makurdi by (Amuta et al.,2010) which indicated a significantly higher rate of *Babesia* infection among local breeds than exotic breeds. Also, this result was in agreement with the reports of Bryson *et al*., (2000) in Northwest Province, South Africa and Abdulkareem *et al*., (2019) in Kwara State, Nigeria. But differs from the report of Agu *et al*., (2020) who observed a higher prevalence of ectoparasites infestation in exotic breeds than the local breeds. The higher prevalence in local breeds may be attributed to the fact that most of the local breeds sampled were on semi free range management and also due to nonchalant attitude of local dog owners who rarely treat or even immunize them.

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