

Haemoparasites of exotic breeds of dogs and its associated risk factors in Maiduguri, North eastern, Nigeria

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ABSTRACT

Aim: The aim of study was to determine the prevalence of haemoparasites of dogs and its associated risks factors in Maiduguri, North eastern, Nigeria.

Method and materials: A total of 105 blood samples were collected from dogs and the blood was transferred into sample bottles containing EDTA as anticoagulant. The samples (n=105) were examined in parasitology laboratory using wet mount, Thin blood smear, buffy coat technique. The prevalence was calculated for all the data as the number of infected dogs divided by total number of dogs examined and was expressed in percentage by multiplying by 100. The analysis of data was done using Graph Pad Prism Version 5.

Results: This study revealed an overall prevalence of 19(18.0%) of haemoparasites from dogs in Maiduguri with *Babesia canis* and *Ehrlichia canis* 14(13.3%) and 5(4.7%) respectively. For age category 68 dogs sampled were less than 1 year with a prevalence of 5 (7.3%) while 37 were above 1 year with a prevalence of 14(37%). For Sex 60 male were sampled and had a prevalence of 13(21.6%) and 55 female sampled had a prevalence of 6 (10.9%). For the management practice 78 of the dogs were indoor dogs who had a prevalence of 8(10.2%) and 27 outdoor dogs with a prevalence of 11(40.7%).

Conclusion: It was concluded that *Babesia canis* and *Ehrlichia canis* are prevalent in the study area and could affect dogs irrespective of age, sex, management practice and location. Therefore, priorities should be given to these risks factors while implementing control measures.

Keywords: *Babesia Canis*, *Ehrlichia Canis*, Dogs, Haemoparasites, Risk factors

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Introduction

Companion animals' dogs and cats are kept at home as pets, cattle and sheep herding, protection against predators, hunting, drugs detection, leading the blind and Military service (Kamani *et al.*, 2011; Okubanjo *et al.*, 2013). Dogs are infected by Haemoparasitic diseases causing debilitating impact on their health and wellbeing worldwide (Ellis *et al.*, 2003). These blood parasites have always been a major challenge in dogs because of their adverse effect on haematological parameters and rate of spread from one animal to the other (Phuyal *et al.*, 2015). Majority of infections are Transmitted through biting ticks, blood transfusion, bites wounds, and trans placental transmission (Adamu *et al.*, 2017; Jirata *et al.*, 2018).

Dogs infected have clinical signs such as Fever, lethargy, pale gums and tongue, red or orange colour urine, jaundice, enlarged lymph nodes, enlarged spleen, Increased heart and respiratory rates, vomiting, bleeding disorder and weight loss (Thongsahuan *et al.*, 2020; Audu *et al.*, 2022). Haemoparasites of dogs such as *Babesia canis*, *Trypanosoma cruzi* and *Ehrlichia cani* scould further cause canine vector borne disease (CVBD) in other tropical countries (Bhattacharjee & Sarmah, 2013; Ezema *et al.*, 2021a).

Diagnosis and identification of haemoparasites is carried out through blood smear examinations under light microscope and polymerase chain reaction (PCR). The polymerase chain reaction has made it easy to detect and identify haemoparasites with greater sensitivity and specificity more than microscopy (Jefferies *et al.*, 2003; Franco-Zetina *et al.*, 2019; Obeta *et al.*, 2020) Studies have shown that no single drug is effective in the treatment of haemoparasites (Solano-Gallego *et al.*, 2016). Most

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drugs for the treatment of haemoparasites have side effects and associated with relapse following infection (Köster et al., 2015; Obeta et al., 2020).

It has led to the renewed interests in the infection dynamics of haemoparasites of dogs in the study area. Therefore, the aim of the study is to determine the prevalence of haemoparasites of dogs and its associated risks factors in the study area.

Materials and Methods

The study was carried out in Maiduguri, which is the capital of Borno State Nigeria. The state is situated within the latitude 11°5" N and 11°5" E. The range of temperature is from 35°C to 40°C for most part of the year. It has a population density of 1,738 people per square kilometer. Characterized by two seasons in a year, with a short rainy season from June to September and long dry season from October to June.

Study population and sampling procedure

This cross-sectional study was carried out from the month of September to July, 2024 to determine the prevalence of haemoparasites of Exotic breeds of dogs. Samples were collected based on availability and accessibility. The Formular for sample size was determined using the Thrusfield (2005), were prevalence of 5.5% earlier reported by Adamu et al., (2012) in Maiduguri was used at a confidence interval of 95%. The calculated sample size was 79, but was increased to 105 for precision.

Sample Collection

A total of 105 blood samples were collected from this study. Dogs were properly restrained and blood was collected aseptically using a 21-gauge needle from the cephalic veins of sample dogs. The blood was transferred in to EDTA bottles containing anticoagulant. The blood samples were labelled and transported in a cold chain to the Parasitology laboratory of Veterinary Teaching Hospital University of Maiduguri for processing.

Laboratory Analysis

The samples (n=105) were examined in the parasitology laboratory of the Veterinary Teaching Hospital, University of Maiduguri, Borno State, Nigeria. The diagnostic methods used to detect the presence or absence of haemoparasites are wet mount, thin blood smear, buffy coat methods as described by Cheesbrough (2006) and modified Knotts technique according to (Zajac and Conboy, 2012).

Statistical analysis: The data were presented using descriptive statistics, frequency and percentage.

The analysis of the data was done using Graph Pad Prism Version 5. The prevalence was calculated for all the data as the number of infected dogs divided by the total number of dogs examined and was expressed in percentage by multiplying by 100.

Results and Discussion

Out of 105 sampled dogs from different locations the prevalence of *Babesia canis* and *Ehrlichia canis* were 14(13.3%) and 5(4.7%) respectively with an overall prevalence of 19 (18%) as recorded (Table 1). Different locations within Maiduguri Unimaid Staff Quarters, 29 sampled and had a prevalence of 6(20.6%) New G.R.A, 31 sampled with a prevalence of 4(12.9%) 202 Housing Estate, 24 sampled with a prevalence of 5(20.8%) and Polo Area, 21 sampled with a prevalence of 4(19.0%) as recorded (Table 2). For age category 68 dogs sampled were less than 1 year with a prevalence of 5 (7.3%) while 37 are above 1 year with a prevalence of 14(37%). For Sex 60 male were sampled and had a prevalence of 13(21.6%) and 55 female sampled had a prevalence of 6 (10.9%). For the management practice 78 of the dogs were indoor dogs who had a prevalence of 8(10.2%) and 27 outdoor dogs with a prevalence of 11(40.7%) as recorded (Table 3).

Table 1: Prevalence of Haemoparasites of exotic dogs in Maiduguri

Haemoparasite	Number Sampled	Number Infected	Prevalence (%)
Babesia Canis	105	14	13.3%
Ehrlichia Canis	105	5	4.7%
Total		19	18.0%

Table 2: Prevalence of Haemoparasites of exotic dogs in Maiduguri, Nigeria based on location

Locations	Number Sampled	Number infected	Prevalence (%)
Unimaid Staff Quarters	29	6	20.6%
New G.R.A	31	4	12.9%
202 Housing Estate	24	5	20.8%
Polo Area	21	4	19.0%

This study reveals an overall prevalence of 19(18.0%) of haemoparasites from dogs in Maiduguri with *Babesia canis* and *Ehrlichia canis* 14(13.3%) and 5(4.7%) respectively. Similar study in Maiduguri reported prevalence of 17 (14.2%) of haemoparasites with *Babesia canis* and *Ehrlichia canis* 15(12.5%) and 2(1.6%) respectively by (Ezema et al., 2021a). Prevalence of 18(6.9%) of haemoparasites with *Babesia canis* and *Ehrlichia canis* 14(5.2%) and 4(1.7%) respectively in Potiskum by (Audu et al., 2022).

Table 3: Prevalence of haemoparasites of exotic dogs in Maiduguri based on Age, Sex and Management practice

Variables	Categories	Number Sampled	Number infected	Prevalence (%)
Age	0 – 1 Year	68	5	7.3%
	> – 1 Year	37	14	37.8%
Sex	Male	60	13	21.6%
	Female	55	6	10.9%
Management Practice	Indoor	78	8	10.2%
	Outdoor	27	11	40.7%

In Nigeria prevalence of canine babesiosis was reported from different locations 26 (17.3%) in Zaria by (Okubanjo et al., 2013), (19.6%) in Zaria by (Ehimiyein et al., 2018) (13.33%) in Jos south by (Oguche et al., 2020), 52(10.8%) in Abuja by (Obeta et al., 2020), 36(12.8%) in Jere by (Ezema et al., 2021b).

For Risk factors, this study reported that the young dogs had lower prevalence of 5 (7.3%) compared to adult 14(37%) (Table 3) similar to reports of other studies, young 61(3.1%) and adult 69 (20.6%) by (Oguche et al., 2020), young 15(5.3%) and adult 21(7.5%) by (Ezema et al., 2021b), young 4 (6.2%) and adult 13(23.2%) (Ezema et al., 2021a). While other studies reported higher prevalence of babesia infection in the young (34.1%) than (10.4%) in adult by (Okubanjo et al., 2013) young 8(8.7%) and adult 10 (6.0%) by (Audu et al., 2022), young 33(17.0%) and adult 7(7.4%) by (Obeta et al., 2020). For Sex, males had a higher prevalence of 13(21.6%) compared to females 6(10.9%) (Table 3) similar to reports of other studies, males 84(56%) and females 66(44%) (Okubanjo et al., 2013), males 13 (7.0%) and females 5(6.8%) (Audu et al., 2022), males 31 (13.7%) and females 21(8.3%) (Obeta et al., 2020), males 23(8.2%) and females 13(4.6%) (Ezema et al., 2021b), males 11(21.5%) and females 6(8.6%) (Ezema et al., 2021a). This could be due to the frequent roaming of the males in search of mating females and establishing territories which expose them to tick vectors while other studies reported lower prevalence of babesia infection males 57 (12.3%) than females 73 (14.1%) (Oguche et al., 2020).

For the management practice, indoor dogs had a lower of prevalence of 8(10.2%) compared to outdoor dogs 11(40.7%) (Table 3). It contradicts studies by Ezema et al., (2021a) who reported that indoor dogs have higher prevalence of 8(25.0%) than outdoor dogs 9(10.2%). Higher prevalence in outdoor dogs could be attributed to their roaming nature which predisposes them to the various stages of the ticks. Owners may try to control tick

infestation on dogs but due to their inability to put them on leash, dogs still go out and get infested with tick vector resulting in waste of owners resources.

For breed disposition, breed specific rate for babesiosis was higher in exotic breed than local breed as reported by (Okubanjo et al., 2013; Obeta et al., 2020; Ezema et al., 2021a) while others reported more in local than exotic breed (Oguche, et al., 2020 and Audu et al., 2022).

Conclusion

It was concluded that *Babesia canis* and *Ehrlichia canis* are prevalent in the study area and could affect dogs irrespective of age, sex, management practice and location. Therefore, priorities should be given to these risks factors while implementing control measures against the infection and recommends regular veterinary consultation and responsible dog ownership.

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