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Research Article

Study on the Prevalence of Clinical Canine Babesiosis and Ehrlichiosis in Nairobi, Kenya

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ABSTRACT

Canine babesiosis and ehrlichiosis are tick-borne diseases that often cause life-threatening illness in dogs worldwide. Though the diseases are enzootic in Kenya, their prevalence is currently unknown. The respective median prevalence rates for the 24-year period (1987 to 2010) were 1.41% (interquartile range: 1.15, 1.71) for babesiosis and 0.89% (interquartile range: 0.69, 1.29) for ehrlichiosis. Further, a steady decline in the annual prevalence rates was evident for both diseases. No association was observed between annual prevalence rates of either disease and annual rainfall amounts. The results suggest changing patterns in the frequency of canine babesiosis and ehrlichiosis in this geographic setting.

Key words: Babesiosis, Ehrlichiosis, Pattern, Prevalence

INTRODUCTION

Canine babesiosis and ehrlichiosis are tick-borne diseases that often cause life-threatening illness in dogs worldwide. Babesiosis is caused by *Babesia spp* parasites that infect and destroy red blood cells (Schoeman 2009), whilst the *Ehrlichia spp* organisms that cause ehrlichiosis are intracellular obligates that infect and reside within monocytes and macrophages (Harrus and Waner, 2011). A wide range of clinical symptoms including fever, anorexia, anaemia, lymphadenopathy and splenomegaly characterizes both diseases, but specific morphological features on light microscopy of blood smears aid confirmatory diagnosis of either condition (Schoeman 2009; Harrus and Waner, 2011). Clinical observational based congestion of mucous membrane has been reported to be an important finding in Ehrlichiosis in dogs (Kitaa *et al*., 2014). Molecular and serological methods are also available for confirmatory diagnosis (Harrus and others 1997; Baneth and others 2009; Irwin, 2009; Schoeman 2009). Prevalence of subclinical haemoparasites has been reported by a number of workers in various species other than dogs globally and is a serious concern for the livestock keepers. Prevalence of subclinical babesiosis in water buffaloes reported to be 7.33% (Khan *et al*., 2009).

Like many countries in Africa, *Babesia* and *Ehrlichia* parasites are enzootic in Kenya but their frequency in the canine population is unknown. Such data are necessary for both the evaluation of disease control strategies and the understanding of disease epidemiology. Here, we sought to estimate the prevalence of canine babesiosis and ehrlichiosis by retrospective analysis of records collected over 24 years at a small animal veterinary practice in Nairobi, Kenya.

MATERIALS AND METHODS

Records of all animals presented to St. Austin's Veterinary Clinic, Nairobi, whether due to illness or for routine vaccinations and elective procedures, between January 1987 and December 2010 (N=88,104) were reviewed and the number of dogs presenting with a diagnosis of either babesiosis or ehrlichiosis determined. Diagnosis was based on characteristic clinical manifestations accompanied by presence of *Babesia* or *Ehrlichia* parasites, respectively, on giemsa-stained blood smears viewed by light microscopy. For each year, a tally of the number of dogs presenting with either disease was obtained and expressed as a percentage of the total number of animals presenting to the veterinary clinic in

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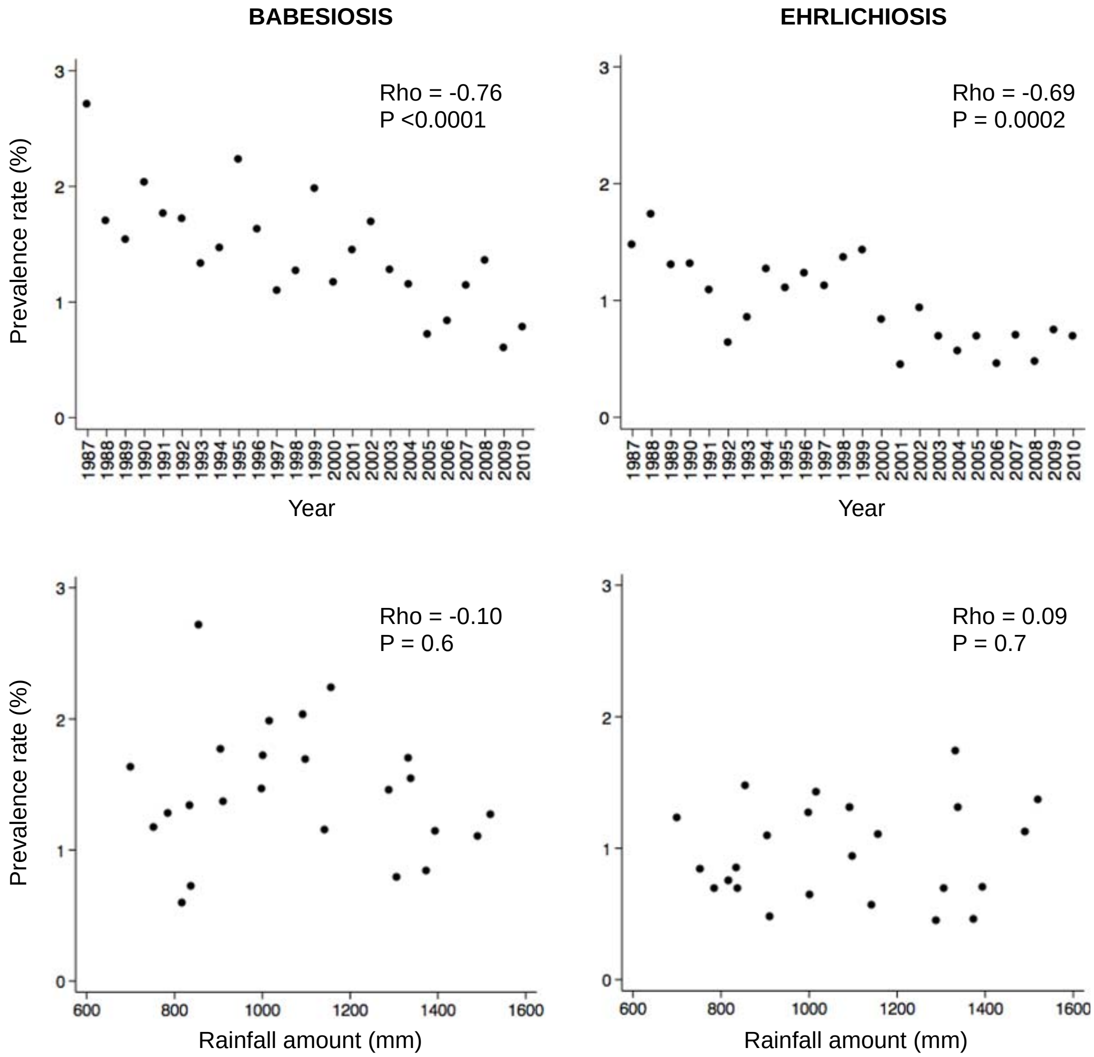

Fig. 1: Prevalence rates of canine babesiosis and ehrlichiosis over 24 years

the same year, yielding an estimate of the annual prevalence rate (Table 1). Spearman's rank correlation coefficient was then used to assess the relationship between prevalence rate of each disease and calendar year using the statistical software Stata™ version 11.

We analysed whether differences in annual rainfall amount over the study period could account for the observed reduction in disease prevalence. The total annual rainfall levels from two weather stations covering the catchment area for the veterinary clinic, that is Dagorretti Corner and Kabete stations, were obtained from the Kenya Meteorological Department and related to disease prevalence.

RESULTS

Over the 24-year period a total of 1,248 and 839 dogs presented with babesiosis and ehrlichiosis respectively. The respective median prevalence rates for the 24-year period were 1.41% (interquartile range: 1.15, 1.71) for babesiosis and 0.89% (interquartile range: 0.69, 1.29) for ehrlichiosis. Comparison of prevalence rates between years revealed a statistically significant decline in the frequency of both diseases over the study period (Figure 1, top panel).

No association was evident between these rainfall data and the prevalence rate of either disease. (Figure1, bottom panel).

Spearman's rank correlation coefficient is used to assess the relationship between annual prevalence rates of both canine babesiosis and ehrlichiosis and either: calendar year (figure 1, top panel) or the average of the total annual rainfall amounts for the two weather stations in the catchment area of the veterinary clinic (Figure 1, bottom panel).

DISCUSSION

Whilst a role for climatic factors in reducing disease prevalence cannot be completely discounted, other factors such as disruption of tick habitats by new buildings and infrastructure as well as the availability of better tick control methods appear to contribute to the reduction of Ehrlichia and Babesia in the study area. A similar analysis by Thuo *et al*. 2014, found no statistical significance in the occurrence of canine babesia between the rainy and

Table 1: Declining prevalence of babesiosis and ehrlichiosis in Nairobi, Kenya between 1987 and 2010.

Year	Total consultations	Babesiosis cases (%)	Ehrlichiosis cases (%)
1987	1696	46 (2.7)	25 (1.5)
1988	2471	42 (1.7)	43 (1.7)
1989	3374	52 (1.5)	44 (1.3)
1990	3050	62 (2.0)	40 (1.3)
1991	3121	55 (1.8)	34 (1.1)
1992	3440	59 (1.7)	22 (0.6)
1993	3524	47 (1.3)	30 (0.9)
1994	3474	51 (1.5)	44 (1.3)
1995	3898	87 (2.2)	43 (1.1)
1996	5286	86 (1.6)	65 (1.2)
1997	4462	49 (1.1)	50 (1.1)
1998	4252	54 (1.3)	58 (1.4)
1999	4340	86 (2.0)	62 (1.4)
2000	4188	49 (1.2)	35 (0.8)
2001	3581	52 (1.5)	16 (0.4)
2002	4904	83 (1.7)	46 (0.9)
2003	4067	52 (1.3)	28 (0.7)
2004	3900	45 (1.2)	22 (0.6)
2005	3758	27 (0.7)	26 (0.7)
2006	3704	31 (0.8)	17 (0.5)
2007	3587	41 (1.1)	25 (0.7)
2008	3377	46 (1.4)	16 (0.5)
2009	3339	20 (0.6)	25 (0.7)
2010	3311	26 (0.8)	23 (0.7)

dry seasons. Similarly, Buoro *et al.*, 1992, found that although there was an increase in the population of Rhipicephalus Sanguines, the tick responsible for the transmission of both Ehrlichia Canis and Canine Babesia, there was no corresponding increase in the occurrence of the two diseases. This implies that other factors may be involved in the occurrence of the diseases such as dog population immunity and possible parasite attenuation in the intermediate host tick.

Globally there has been a shift in the prevalence of Babesiosis into cooler climates as global climatic changes have made ticks more adaptive. Berzina *et al*., 2013, Leschnik *et al.*, 2008, Paulauskas *et al*., 2014.

Overall results show changing patterns in the prevalence of canine babesiosis and ehrlichiosis among animals presented for veterinary care in Nairobi. As this study is limited to only one veterinary clinic, data from other veterinary practices within the country will help determine the geographic extent of our observations. This study has shown a significant decline in the occurrence of canine babesiosis and ehrlichiosis in Nairobi over the 10 years analysed (Table 1).

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