

Original Research Article

Babesiosis in a Cattle Slaughtering Abattoir in Abeokuta, Nigeria

ABSTRACT

Babesiosis, an haemoparasitic disease caused by *Babesia spp* and transmitted by ticks is one of the major public health threat to cattle rearing in most countries, including Nigeria. The disease impose a serious burden on the healthcare infrastructure of both the cattle and their handlers. This study therefore investigated the prevalence of Babesiosis in a cattle slaughtering abattoir in Abeokuta, Ogun State, Nigeria. A total of 162 cattle were examined between May and August 2014. Blood samples were collected from the jugular vein of the cattle at point of slaughter in bottles containing ethylene diamine tetraacetic acid (EDTA) and transported to the laboratory for parasitological examination. Using microscopy, prepared giemsa stained slides were observed under high powered digital Swift™ microscope at 4,500,000 resolution and x100 objective lens. Of the 162 cattle sampled, 83(51.2%) were males and 79(48.8%) were females. A prevalence of 8% was recorded for babesiosis with no significant difference ($P>0.05$) in infection by sex. The findings of this study showed that Babesiosis is endemic in the study area although with a low prevalence. Nevertheless, proper tick control methods using acaricides and treatment with drugs in some of the source ranches of the cattle would be necessary to avoid vertical transmission between infected cattle and susceptible ones.

KEYWORDS: Cattle, Babesiosis, Abattoir, Abeokuta, Nigeria

INTRODUCTION

Livestock systems occupy about 30% of the planet's ice-free terrestrial surface area, employing approximately 1.3 billion people globally and directly supporting the livelihoods of 600 million smallholding farmers in the developing countries (Thornton, 2010). In Nigeria, ruminants comprising sheep, goats and cattle constitute the livestock farm animals and about 22.1million sheep, 34.5million goats and 13.9million cattle are currently been reared by farm families in the country (Lawal-Adebowale, 2012). Of the ruminants livestock, cattle is regarded as the main source of animal protein in most household, and their products such as milk, hoof, bones, blood, hides and skin are also of great economic benefits (Sansoucy, 1995). Babesiosis, an haemoparasitic disease caused by *Babesia spp* and transmitted by ticks is one of the major public health threat to cattle rearing in most countries, including Nigeria (Samreen *et al.*, 2012). The disease imposes a serious burden on the healthcare infrastructure of both the cattle and their handlers (Okorafor and Nzeako, 2014). Unlike other haemoparasites, babesiosis distresses adult cattle more severely than younger ones, leading to reduced food conversion rates, reduced milk/meat production rates, abortion and death (Bock *et al.*, 2004; Onoja *et al.*, 2013). In Nigeria, control measures including spraying cattles with tickicides, destruction of ticks by pasture burning, and introduction of the vectors natural enemies to feed on ticks have been employed in areas where the disease have been reported (Olubunmi, 2013). However, there is paucity of information on disease prevalence among cattle slaughtering abattoirs in Abeokuta, south west Nigeria. This information is needed to help inform best control practices in the area.

This study therefore investigated the prevalence of Babesiosis in a cattle slaughtering abattoir in Abeokuta, Ogun State, Nigeria.

Materials and Methods

Study Area

This research was carried out at Gbonogun Abattoir. The abattoir is located on coordinates 07.1794553N and 03.406107E in Abeokuta, south western Nigeria. Abeokuta, the Ogun State capital has a tropical climate and enjoys double maxima of rainfall from April –July and September - October with dry season from November to March. The research was carried out between May and August, 2014.

Study Design and Selection of Cattle

This study employed a cross sectional survey design. A total sampling of 162 cattle was carried out during the study. A census was conducted followed by registration of tags on each of the cattle

Ethical considerations

Study protocol was approved by the appropriate ethics committee of Federal University of Agriculture, Abeokuta. Study animals were handled in accordance with the “Guide for the Care and Use of Laboratory Animals” of the NRC.

Collection of Blood samples

Blood samples were collected from the jugular vein of the animals at point of kill (slaughter) in EDTA bottles. Each bottle were properly labelled with the breed, sex and age of the cattle immediately after collection. Samples were transported in ice packs to the Parasitology laboratory, Department of Pure and Applied Zoology for laboratory analysis.

Laboratory Analysis

A drop of blood was collected using a micro pipette from the sample bottles for each cattle and placed on a clean and grease free microscope slide. Thin blood smears were made, air dried, fixed in absolute methanol for 1minutes and stained with 10% (1:10) giemsa stain accordingly (Sultan *et al.*, 2013). Slides were examined for *Babesia spp.* under X100 objective lens.

Data Analysis

Data obtained were analyzed descriptively using IBM SPSS 20.0 software. Descriptive statistics was employed in the presentation of prevalence estimates, and cross tabulations were made in comparing the demographic variables with prevalence estimates. Associations between variables were ascertained using Pearson chi-square and confidence interval was set at $p \leq 0.05$.

RESULTS

Demographic information of cattle slaughtered at the Abattoir

Of the 162 cattle slaughtered and examined for babesiosis, 83(51.2%) were males while 79(48.8%) were females. By age category, majority of the cattle 93(57.4%) were below age 5, while 69(42.6%) were between age 6-8. Distribution of cattle by breed showed that 43(26.5%), 36(22.2%), 36(22.2%), 35(21.6%) and 12(7.4%) and of the cattle were sokoto gudali, fulani breed, Ndama, cross breed and Red bororo respectively (Table 1).

Table 1: Demographic information of cattle slaughtered at the Abattoir

	Number Examined	Percentage (%)
Sex		
Male	83	51.2
Female	79	48.8
Total	162	100
Age group (months)		
0-36 months	8	4.9
36-48 months	39	24.1
48-60 months	46	28.4
60-72 months	29	17.9
72-84 months	25	15.4
84-96 months	15	9.3
Total	162	100
Breed		
White Fulani	36	22.2
<u>Sokotogudali</u>	43	26.5
Ma	36	22.2
Red Bororo	12	7.4
Cross breed	35	21.6
Total	162	100

Prevalence of babesiosis and other haemoparasite among cattle slaughtered at the Abattoir

Of the 162 cattle examined, 13(8%) were positive for *babesia spp.* Three other haemoparasites; *Theileria spp.*, *Anaplasma spp.* and *Trypanosoma brucei* were observed alongside *babesia spp.*, with prevalence rate of 17(10.5%), 30 (18.5%) and 3(1.9%) respectively. An overall prevalence of 27.8% was recorded, with 45 cattle infected with at least one of the four haemoparasite observed (Table 2)

Table 2: Prevalence of babesiosis and other haemoparasite among cattle slaughtered at the Abattoir

	Number Examined	Number Infected (%)
<u>Babesia spp</u>	162	13 (8)
<u>Theileria spp.</u>	162	15(9.3)
<u>Anaplasma spp.</u>	162	30(18.5)
<u>Trypanosoma brucei</u>	162	3(1.9)
<u>Any haemoparasite</u>	162	45(27.8)

Prevalence of babesiosis and other haemoparasite by sex, age and breed of cattle slaughtered at the Abattoir

Majority of the cattle examined 83 (51.2%) were females, although males were the most infected across the study except for *Trypanosoma brucei* infection, however there exist no significant difference ($P>0.05$). By age category, majority of the infected cattles across the study were within 36-72 month age category, however there exist no significant difference ($P>0.05$). Significant difference ($P<0.05$) exist for infection with *Theileria spp* and *Trypanosoma spp* in infected cattle by kind of breed across the study (Table 3).

Table 3: Prevalence of gastrointestinal helminths babesiosis and other haemoparasite by sex, age and breed of cattle slaughtered at the Abattoir

	Number Examined	<i>Babesia spp</i> NI (%)	<i>Theileria spp</i> NI (%)	<i>Anaplasma spp</i> NI (%)	<i>Trypanosoma brucei</i> NI (%)
Sex					
Male	83	7(8.4)	9(11.4)	16(20.3)	1(1.3)
Female	79	6(7.6)	6(7.2)	14(16.9)	2(2.4)
Total	162	13(8)	15(9.3)	30(18.5)	3(1.9)
<i>P value</i>		$P = 0.844$	$P = 0.361$	$P = 0.579$	$P = 0.589$
Age (in years)					
0-36 months	8	0(0)	0(0)	2(25.0)	0(0)
36-48 months	39	5(12.8)	2(5.1)	6(15.4)	2(5.1)
48-60 months	46	4(8.7)	5(10.9)	8(17.4)	0(0)
60-72 months	29	4(13.8)	4(13.8)	7(24.1)	0(0)
72-84 months	25	0(0)	3(12.0)	6(24.0)	1(4.0)
84-96 months	15	0(0)	1(6.7)	1(6.7)	0(0)
Total	162	13(8)	15(9.3)	30(18.5)	3(1.9)
<i>P value</i>		$P = 0.241$	$P = 0.730$	$P = 0.697$	$P = 0.442$
Breed					
White Fulani	36	1(2.8)	2(5.6)	6(16.6)	0(0)
Sokoto Gudali	43	6(13.9)	2(4.7)	7(16.3)	0(0)
Ndama	36	1(2.8)	1(2.8)	4(11.1)	0(0)
Red Bororo	12	1(8.3)	4(33.3)	3(25)	3(25)
Cross breed	35	4(11.4)	6(17.1)	10(28.6)	0(0)
Total	162	13(8)	15(9.3)	30(18.5)	3(1.9)
<i>P value</i>		$P = 0.259$	$P = 0.006$	$P = 0.378$	$P = 0.000$

NI – Number infected

DISCUSSION

Our findings showed that babesiosis is endemic in the study area, with a prevalence rate of 8.0% among the cattle examined. This result is in accordance with a similar study in Zaria, Northern Nigeria where a prevalence of 9.5% was recorded (Onoja *et al.*, 2013). However, the prevalence reported in this research is very low compared to that of Okwelum *et al.* (2013) and Kamani *et al.* (2010) where prevalence of 57.1% and 16.0% were recorded respectively. The differences in sample size, study area, husbandry practices, veterinary care and state of immunity of the cattle examined are probable reasons for prevalence rate incongruencies (Ntonifor *et al.*, 2013).

The presence of other haemoparasites such as *Trypanosoma spp*, *Theileria spp* and *Anaplasma spp* also confirms the availability of other disease vectors in the study area (Walker *et al.*, 2003). An overall prevalence of 27.8% recorded for haemoparasitemia calls for concern as this is higher than that reported by Kamani *et al.* (2010). Infected cattle can serve as a reservoir of infection for vectors, susceptible livestock and humans, and this could lead to reduced food conversion rates, reduced milk/meat production rates, abortion and death (Bock *et al.*, 2004; Onoja *et al.*, 2013).

Although male cattle were more infected than their female counterpart in our study with no significant difference, this is in deviant with the findings of Kamani *et al.* (2010) and Okorafor and Nzeako, (2014), where females had more infections. This shows that both females and males are susceptible to infection with haemoparasites in areas where the disease vectors are endemic. However, it is important to note that extended breeding practices for economic reasons such as calving and milk production in females could lead to accumulation of parasites due to their long time exposures to disease vectors (Okorafor and Nzeako, 2014). Females are usually kept longer in the ranch for reproductive purposes, with only the old-weak less productive ones sold to butchers for slaughter at the abattoir. Reports of Agu *et al.* (1990); Agu and Amadi (2001); Enwezor *et al.* (2009) and Kamani *et al* (2010) have also implicated sex dimorphism in the incidence of haemoparasitism in Nigeria.

This study have revealed that babesiosis and other haemoparasites are endemic in the study area, although the prevalence of babesiosis is low. Nevertheless, proper tick control methods using acaricides and treatment with drugs in some of the source ranches would be necessary to avoid vertical transmission between infected cattle and susceptible ones. Continuous screening of cattle at source ranches should be encouraged followed by application of appropriate control measures aimed at reducing to the barest minimum the prevalence of babesiosis and other haemoparasites.

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