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Research Article

Haemoparasites Status of Domestic Horse (*Equus caballus*) at two Polo Fields in South Southern Nigeria

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Abstract

Background and Objective: Information on the haemoparasites status of *Equus caballus* in Nigeria are fragmentary. This study was carried out to assess the haemoparasite status of *Equus caballus* in the two polo fields located in Abraka and Port Harcourt in South Southern Nigeria. **Materials and Methods:** One hundred and four blood samples (24 from Abraka and 80 from Port Harcourt) were collected from selected horses. The procession and identification of haemoparasites followed standard parasitological techniques detected. **Results:** The Overall prevalence of haemoparasites of the horses was 53.56%. The haemoparasites species in the increasing order of prevalence are *Theileria equi*, *Anaplasma phagocytophilum* and *Babesia caballi*, respectively. Horses from the Port Harcourt polo field was more infected than horses from the Abraka polo club. In all the fields, female horses were more infected than males. Prevalence by age was in the increasing order; old horses >10 years was 80.00%, young adult age (4-10 years) was 55.84% and young horses (<4 years) was 29.41%, respectively. The differences in the prevalence of haemoparasite in relation to location, age and gender was not significant ($p>0.05$). Multiple parasitisms was observed across the polo fields. **Conclusion:** The study has documented a high prevalence of hemoparasites amongst *Equus caballus* in polo fields in Port Harcourt and Abraka. It is concluded that adequate grooming attention and care of the horses used in the entertainment industry be advocated to reduce the public health implications and zoonotic infections.

Key words: *Equus caballus*, *Theileria equi*, *Anaplasma phagocytophilum*, *Babesia caballi*, south-south, Nigeria

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Domestic Horse (*Equus caballus*) of the family Equidae and order Perissodactyla is an odd-toed hoofed mammal predominant in South Western Asia¹. Industrial produce obtained from this horse includes milk and hides, bone, blood, hooves and pharmaceutical materials.

Horses and humans interact in many ways. They are used in sports competition, Royal ushering, police duties, agriculture and warfare. The transport of horses across national boundaries for show and performances makes the issue of horse haemoparasite control a matter of global importance². The horse is susceptible to more than 60 parasites among which, several of them are species of worm and haemoparasite³. The parasite burden of the horse is more evident in young and undernourished horses than adults⁴. Although Turaki *et al.*⁵ have studied the prevalence of Piroplasmosis amongst local horses in the Borno States, Emme *et al.*⁶ have reported the clinical manifestation and prevalence of piroplasmosis in Nigerian royal horses in some part of Nigeria and David *et al.*⁷ have also studied the prevalence of parasites in different stables horses in some States of Northern Nigeria, the information on the haemoparasites of *Equus caballus* in Nigeria in relation to parasitic infections are still fragmentary. Increasing the awareness of the risk of zoonotic infections associated with horses and recreational activities is a pre-requisite for controlling horse-man parasitic infections⁸. There is dearth information on the haemoparasite of horses in South Southern Nigeria. This study was therefore aimed at assessing the prevalence of haemoparasitic infection in *Equus caballus* from two polo clubs in south southern Nigeria.

MATERIALS AND METHOD

Study areas: The study was conducted in Turf and Country Club of South-southern Nigeria located in Port Harcourt, Rivers State and Abraka, Delta State respectively during March-May, 2019. The detail about the study location has been extensively described by Eze *et al.*⁹.

Study design: The study adopted a descriptive cross-sectional study on *Equus caballus* kept by organized polo clubs located in Delta and Rivers State. These horses are used for polo sports tournaments and for recreational purposes. They were stabled and supplied with straw, crop residuals from millets and concentrates. Details about the sex, age and nutritional status of the horses were collected from the stable boys. The animals were grouped into three categories as young (<4 years), adult

(4-10 years) and old (>10 years). The age of selected equine was determined by the dentition.

Inclusive criteria: Only domestic Horse (*Equus caballus*) aged <4 years->10 years from Port Harcourt and Abraka polo fields for at least two months before the time of the study.

Blood collection and examination: Blood samples were collected from individual horses through jugular vein puncture using a syringe and needle. The blood was immediately transferred into a duly labeled EDTA bottle. The labeled bottles were transported to the Parasitology unit of the Department of Animal and Environmental Biology, the University of Port Harcourt for analysis within 24-48 hrs of collection. A thin blood smear was prepared in accordance with standard procedures¹⁰. Prepared slides were viewed under the microscope using ×100 oil immersion. The confirmation of positive slide and the identification of parasite followed the pictorial key by Soulsby¹¹.

Statistical analysis: Descriptive analysis was employed to calculate the prevalence of the parasites recorded. The chi-square analysis was done using SPSS version 20 to show the significant differences between variables at $p = 0.05$ level of confidence.

RESULTS

Prevalence of haemoparasite of horses in two polo field:

Out of a total of 104 horses examined, 56 representing 53.85% were found to be infected with one or more haemoparasites. Horses from the Port Harcourt polo club had a higher prevalence (56.28%) than horses from and Abraka polo club (45.85%). Haemoparasites infection was higher in female horses (51.28%) than males (46.15%). Prevalence of infection in horses below 4, 4-10 and >10 years were 29.41, 55.84 and 80.00%, respectively. Differences in infection rates in relation to location, age and was not significant ($p > 0.05$) Table 1.

Table 1: Prevalence of haemoparasite of horses in two polo field in South Southern Nigeria

Variables	No. examined	No. positive	Positive (%)
Locations			
Port Harcourt	80	45	56.28
Abraka	24	11	45.85
Sex			
Male	65	36	46.15
Female	39	20	51.28
Age (Year)			
<4	17	5	29.41
4-10	77	43	55.84
>10	10	08	80.00

Table 2: Multiple parasitism of horses across Study Location, Sex and Age

Variables	No examined	No. of multiple infection (%)	Multiple species- specific parasitism			
			T.e+B.c	T.e+Ap	Bc.+A.p	T.e+B.c+A.p
Locations						
Port Harcourt	45	27 (60.00)	4 (14.81)	11 (40.74)	5 (18.52)	7 (25.93)
Abraka	11	11 (100)	2 (18.18)	6 (54.55)	2 (18.19)	1 (9.09)
Sex						
Male	65	25 (38.46)	5 (20.00)	12 (48.00)	4 (16.00)	4 (16.00)
Female	20	12 (60.00)	1 (8.33)	4 (33.33)	3 (25.00)	4 (33.33)
Age (Year)						
Young (<44)	5	1 (20.00)	0 (0.00)	0 (0.00)	1 (100)	0 (0.00)
Adult (4-40)	43	26 (60.47)	4(15.38)	13 (50.00)	6 (23.08)	3 (11.54)
Old (>10)	8	8 (100.00)	2 (25.00)	2 (25.00)	1 (12.50)	3 (37.50)

T.e+B.c: *Theileria equi*+ *Babesia caballi*; T.e+A.p: *Theileria equi*+ *Anaplasma phagocytophilum*, B.c+A.p: *Babesia caballi*+ *Anaplasma phagocytophilum*, T.e+B.c+A.p: *Theileria equi*+ *Babesia caballi*+ *Anaplasma phagocytophilum*

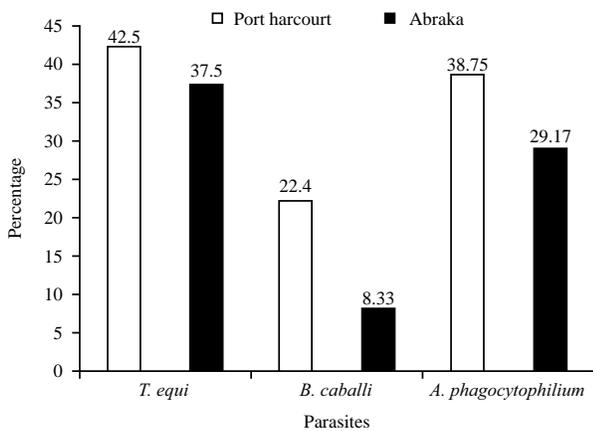


Fig. 1: Species specific prevalence of haemoparasite

Species-specific prevalence of hemoparasites across the location:

Three species of haemoparasites were identified in the study locations. These are *Theileria equi*, *Anaplasma phagocytophilum* and *Babesia caballi*. The species-specific prevalence across locations in their increasing order were; Port Harcourt; (*Theileria equi* (42.5%), *Anaplasma phagocytophilum* (38.75%) and *Babesia caballi* (22.4%). In Abraka; *Theileria equi* was (37.5%), *Anaplasma phagocytophilum* (29.17%) and *Babesia caballi* (8.38%). Differences in infection rates in relation to location was not significant (p>0.05) (Fig. 1).

Multiple parasitisms in horses across the Study Location:

Mixed parasitism was common among the horses in all the study locations. The prevalence of multiple infections by locations was higher in Abraka polo (100%) than in Port Harcourt polo (60%); more in female (60%) than in male (38.46%) and more among age >10 years old (100%) than other age group. Species specific Prevalence of mixed infection in the increasing order across location were as

follows; Port Harcourt Polo (T.e+Ap>T.e+B.c+A.p>Bc.+A.p>T.e+B.c); Abraka polo (T.e+Ap>Bc.+A.p>T.e+B.c>T.e+B.c+A.p). Detail is shown in Table 2.

DISCUSSION

The prevalence of haemoparasites across the two locations was 53.83%. This prevalence was comparable to 51.02% that was reported by Turaki *et al.*⁵ and 58.10% by Valentina¹². However, the present report was lower than 91.25% reported in David *et al.*⁷.

Three species of haemoparasites of *Equus caballus* recorded in this present study were *Theileria equi*, *Babesia caballi* and *Anaplasma phagocytophilum*. This is anovel report of haemoparasites in South southern Nigeria. However, the prevalence of these parasites across location were not significant. This is an indication that both locations had similar environmental conditions that may have supported the proliferation and development of the parasites in the horses used for recreational purposes in the two locations. The three haemoparasites recorded in this present study agrees with a similar report elsewhere^{5,12}. The prevalence of these three haemoparasites in this present study is an indication that the environment of the horse was unkept and the horse breeders had not followed the best practice guidelines. The prevalence of *Theileria equi* and *A. phaoc* was lower than 94% prevalence reported by Turaki *et al.*⁵ and 25.62% prevalence recorded by Valentina¹². However, the prevalence of *Babesia caballi* was lower than the report of Rosales *et al.*¹³ and Díaz-Sánchez *et al.*¹⁴. The differences in the prevalence of the individual haemoparasites highlighted the differences in the climatic and environmental conditions between countries. *Anaplasma phagocytophilum* in prevalence was higher than those by Valentina¹². Anaplasmosis is caused by bacteria species and are transmitted by ticks and mites. The prevalence

of this parasites might be attributed to the presence of bacteria-infested tick serving as ectoparasites on the horse.

The prevalence of the haemoparasites was age and sex-specific. The prevalence of the haemoparasites was higher in females than in male. This observation contradicts the report of Turaki *et al.*⁵, who observed higher prevalence in males than female horses. The higher infection rate recorded in female horses was not surprising because most female adults were exposed to a lot of stresses during breeding and lactation, which may have suppressed their immune system. The prevalence of the haemoparasites increases with the age of the horses. The differences in the age-specific prevalence might be attributed to the decline in humoral immunity in older horses as a result of continual exposure to sources of infection.

Multiple parasitism was observed in this present study. A similar observation was reported by Posada Guzman *et al.*¹⁵. However, there was no significant difference in the multiple parasitisms across age and sex. This observation agrees with Valentina¹² who also encountered poly infection in their works. Mixed infection occurred more in Port Harcourt polo horses than in the Abraka polo club. The multiple parasitisms highlight the feeding habits and the environmental conditions of the horses.

The result of this study implies that, since human makes direct contact with the horses during recreational and sporting activities, there is the likelihood of the horse initiating the transmission of horse related infections on man. This transmission could be made possible through the bite of blood-sucking ectoparasites living on the horse. Although the study was limited only to the blood-based parasites, no effort was made to collect and assess the infection status of ectoparasites on the horse. It is recommended therefore that the horses used for sporting and recreational activities be treated periodically for both haemoparasites and ectoparasite in order to reduce the chances of zoonotic infections.

CONCLUSION

The study has revealed three haemoparasites associated with horses used for recreational and entertainment of events in Port Harcourt and Abraka. The haemoparasites are *Theileria equi*, *Babesia caballi* and *Anaplasma phagocytophilum*. Although these parasites are mostly of animal origin, they can initiate zoonotic infection in humans through the bite of ectoparasites found on the horses. It is recommended that these horses should be treated periodically for both

haemoparasites, ectoparasite and other forms of infections. This will not only make the horses healthy but can reduce parasitic infection through man-horse contact.

SIGNIFICANCE STATEMENT

This study discovered important information that can be beneficial for the control of some zoonotic parasitic infections related to horses. Despite the use of Horses overtime in sports competition, Royal ushering, police duties, agriculture and warfare and many other recreational activities, little is known about the role of horses in the transmission of zoonotic infections to humans. This study has therefore uncovered some haemoparasites of horses that can easily be transmitted to humans. Maintaining regular hygiene of the horse is germane to reducing the menace of horseman diseases.

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