PREVALENCE AND HEMATOLOGICAL PARAMETERS OF BOVINE TRYPANOSOMOSISIN AGUATA AND ORUMBA SOUTH LOCAL GOVERNMENT AREAS OF ANAMBRA STATE

C.F. Obi[a*], M.C. Akata[b], O.J. Ezubelu[b], C.U. Uneze[b]
[a]Department of Veterinary Parasitology and Entomology, University of Nigeria, Nsukka.
[b]Department of Agric Education, Federal College of Education (Technical), Umunze.
***Corresponding Author: E-mail: chukwunonso.obi@unn.edu.ng Phone: +2348063707096**

Abstract
The prevalence and hematological parameters of bovine trypanosomosis were investigated in Aguata and Orumba South Local Government Areas (LGA) of Anambra State. 210 cattle were randomly sampled in Aguata (140) and Orumba South (70) LGAs between February and May, 2017. The blood samples were collected into well labeled bottles containing EDTA. Characteristics of each slaughtered cattle such as sex, breed and body condition scores were noted. The blood samples were screened for trypanosomosis using standard detection techniques. Some hematological parameters of each of the blood samples such as packed cell volume (PCV), red blood cell count (RBC) and white blood cell count (WBC) were also determined using standard techniques. Of the 140 cattle screened at Aguata LGA, 16 (11.43%) were positive for trypanosomosis while 6 (8.57%) were positive out of the 70 cattle screened at Orumba South LGA. The overall prevalence of bovine trypanosomosis was 10.48%. Body condition score significantly influenced ($p<0.05$) the prevalence of bovine trypanosomosis in the study area while sex and breed did not. The PCV, RBC and WBC of the infected cattle differed significantly ($p<0.05$) from those of uninfected cattle. It was therefore concluded that bovine trypanosomosis is endemic in Aguata and Orumba South LGAs and is associated with changes in hematological parameters.
Keywords: Prevalence; hematological parameters; trypanosomes; cattle; Anambra State.

Introduction

African trypanosomosis is caused by one or more of the tsetse fly-borne haemoflagellate protozoan parasites belonging to the genus *Trypanosoma* (Anene *et al.*, 2001). The disease has been continually recognized as a cause of morbidity and mortality since 20th century in humans and animals throughout sub-Saharan Africa (Oyewusi *et al.*, 2010). African trypanosomosis has remained a serious setback to improved and profitable livestock production, crop production and the realization of the millennium development goals (MDGs) in tropical Africa (Oyewusi *et al.*, 2010). Presently, about 55,000 human and 3 million livestock deaths reported annually are attributable to the disease, with over 60 million people and 48 - 55 million livestock at risk (Obi *et al.*, 2013).

Nigeria, the most populated country in Africa and with the highest number of cattle in West Africa (Samdi *et al.*, 2010), is heavily at risk. The socioeconomic effects of the trypanosomosis are still on the increase, thus effective control of the disease is imperative. Despite almost a century of tsetse and trypanosomosis control efforts, the disease still ravages Nigeria and the sub-Saharan Africa, and is still far from been resolved.

The prevalence of trypanosomosis in different parts of Nigeria has been variously reported by several researchers (Odeniran and Ademola, 2018). However, paucity of information exists on the prevalence of bovine trypanosomosis in Anambra State especially in Aguata and Orumba South Local Government Areas (LGA). Given the zoonotic nature of bovine trypanosomosis, active surveillance is highly essential. Thus, this study seeks to determine the hematological parameters and prevalence of bovine trypanosomosis in Aguata and Orumba South Local Government Areas of Anambra State, Nigeria.

Materials and method

Study area: The study was conducted between February and May, 2017 in Aguata LGA (Uga slaughter slab and Igbo-Ukwu slaughter slab) and Orumba South Local Government Area (Umunze slaughter slab) of Anambra State.

Study population and sampling method: 210 cattle presented for slaughter at these slaughter slabs were randomly sampled. The sex, breed and body condition scores of the cattle were recorded. Breed identification was based on morphology while appearance of external genitals was the basis for sex differentiation. The body condition score of cattle was evaluated on a four point scale based on slight modification of the method described by DEFRA (2001).

Blood sample collection: 3 milliliters of blood samples were collected from the jugular vein of cattle at slaughter into a labeled sample bottle containing EDTA. The blood samples were placed in a flask containing ice packs before being transported to the Animal Science Laboratory of the Department of Agricultural Education, Federal College of Education (Technical), Umunze for analysis.

Trypanosome detection and hematological analysis: The blood samples were screened for trypanosomes using standard detection techniques; wet blood films, buffy coat method and Leishman stained thin smear (Murray *et al.*, 1977). The packed cell volume (PCV), red blood cell count (RBC) and White blood cell count (WBC) were also determined using standard techniques (Coles, 1986).

Data analysis: The data obtained from this study were analyzed using Graphpad® statistical software. Chi-square test was used to determine the possible association between the prevalence rates and sex, breed, and body condition scores. Hematological parameters were compared using students' t-test. Values of $p<0.05$ were considered significant.

Results and Discussion

The prevalence of bovine trypanosomosis were 8.57% and 11.43% for Orumba South and Aguata LGAs respectively while the overall prevalence rate was 10.48% (Table 1). This finding was very high compared to the 2.2% and 3.7% reported by Samdi *et al.* (2011) in Kaduna and Ohaeri (2010) in some parts of Abia State respectively. The 46.8% prevalence recorded by Majekodunmi *et al.* (2013) in Jos was higher than the prevalence rate obtained in the current study. The differences in the prevalence rates of bovine trypanosomosis could be attributed to the climatic conditions of the different locations, season, availability of the vector, diagnostic method utilized, livestock management system, frequency of trypanocidal intervention amongst other factors.

In Aguata LGA, males had a prevalence rate of 7.14% while females had 4.29% prevalence (Table 1). Orumba South LGA recorded 7.14% and 1.42% prevalence rates for male and female cattle respectively. The overall prevalence for both male and female cattle in the study area was 7.14% and 3.33% respectively. Based on the breeds of cattle sampled, White Fulani, Sokoto Gudali and Red Bororo had 8.57%, 2.14% and 0.71% prevalence rates respectively in Aguata LGA while in Orumba South LGA, 1.42%, 5.71% and 1.42% prevalence were obtained for White Fulani, Sokoto Gudali and Red Bororo respectively. The overall prevalence rates were 6.19%, 3.33% and 0.95% for white Fulani, Sokoto Gudali and Red Bororo respectively. Sex and breed were found not to exert any influence on the prevalence of bovine trypanosomosis in the study area although; male cattle and White Fulani breed of cattle were the most infected. This could be attributed to the fact that the White Fulani breed and male cattle constituted more than half of the cattle sampled. Similar findings have been reported by several authors (Ohaeri, 2010; Samdi *et al.*, 2011).

The prevalence rates of 3.57%, 6.43%, 1.43% and 0% were obtained in cattle with thin, moderate, good and excellent body condition scores in Aguata LGA (Table 1). In Orumba South LGA, thin, moderate, good and excellent body condition scores had prevalence rates of 2.86%, 4.29%, 1.42% and 0% respectively. The overall prevalence rates were 3.3%, 5.71%, 1.42% and 0% for thin, moderate, good and excellent body condition scores. Body condition score significantly influenced ($p<0.05$) the prevalence of bovine trypanosomosis in the study area with thin (emaciated) animals being infected most. This could be attributable to poor nutrition and management as poorly fed and managed animals look emaciated and are prone to various diseases and infections including trypanosomosis.

Some hematological parameters of cattle slaughtered at both Aguata and Orumba South Local Government Areas were presented in Table 2. The mean PCV and RBC values of the cattle were found to be significantly low ($p<0.05$) when compared to the uninfected cattle suggesting anemia. Anemia is the most consistent

clinical signs of trypanosomosis (Obi *et al.*, 2013) and its pathogenesis are multifactorial (Taylor and Authie, 2004). However, concurrent gastro-intestinal parasites and poor nutrition could also be attributed to the low PCV observed. The WBC counts of the cattle infected with trypanosomosis was significantly higher ($p<0.05$) than that of the uninfected cattle. This could probably be due to the body's increased production of leucocytes to fight against invading pathogens during infection (Obi *et al.*, 2013). Samdi *et al.* (2011) reported a significant decline in the PCV of the infected cattle compared to the uninfected cattle.

Conclusion

Bovine trypanosomosis is endemic in Aguata and Orumba South Local Government Areas of Anambra State and were associated with some hematological changes. Sex and breed did not influence the prevalence while body condition score influenced the prevalence of bovine trypanosomosis in the study area.

Recommendation: Systematic and radical institution of integrated trypanosomosis control measures involving vector control, chemoprophylaxis and chemotherapy so as to improve production potentials of animals and owners' economic wellbeing.

References

Anene BM, Onah DN, Nawa Y. (2001). Drug resistance in Pathogenic African trypanosomes; what hopes for the future? *Vet Parasitol.* 96: 83 – 100.

Coles EH. (1986). Veterinary Clinical Pathology, 3rd ed. W.B. Saunders Company, Philadeliphia, pp: 145-151.

Department for Environment, Food and Rural Affairs (DEFRA) (2001). Condition Scoring of Beef Suckler Cows and Heifers. Retrieved on 18th February, 2017 from http://www.defra.gov.uk/corporate/publications/pubfrm.htm.retrived 09-04-2017.

Murray M, Murray PK, Mclntrye WI. (1977). An improved technique for the diagnosis of African trypanosomiasis. *Trans. R. Soc. Trop. Med. Hyg.*, 71: 325-326.

Obi CF, Obidike IR, Ezeh IO, Omoja VU, Iheagwam CN, Idika IK, Ezeokonkwo RC. (2013). Effects of *Trypanosoma brucei* infection and diminazene aceturate therapy on testicular morphology and function of Nigerian local dogs. *Vet Parasitol.* 196(3): 283-288.

Odeniran PO, Ademola IO. (2018). A meta-analysis of the prevalence of African animal trypanosomosis in Nigeria from 1960 to 2017. *Parasites and Vectors* 11:280.

Ohaeri CC. (2010). Prevalence of trypanosomiasis in ruminants in parts of Abia State, Nigeria. *Journal of Animal and Veterinary Advances* 9(18):2422-2426.

Oyewusi JA, Saba AB, Oridupa OA. (2010). The Course of Trypanosomosis in Laboratory Rabbits following experimental infection, Treatment and Re-infection: Haematological study. *European Journal of Scientific Research*, **42,** 397 – 405.

Samdi SM, Abenga JN, Attahir A, Haruna MK, Wayo BM, Fajinmi AO, Sumayin HM, Usman AO, Hussaina JZ, Muhammad H, Yarnap JE, Ovbagbedia RP, Abdullahi RA. (2010). Impact of Trypanosomosis on Food Security in Nigeria: A Review. *Int. J. Animal Vet. Adv.* 2(2):47-50.

Samdi SM, Fajinmi AO, Kalejaiye JO, Wayo B, Haruna MK, Yarnap JE, et al. (2011). Prevalence of trypanosomosis in cattle at slaughter in Kaduna Central Abattoir. *As J Anim Sci.* 5:162–5.

Taylor K., Authie EML (2004). Pathogenesis of Animal Trypanosomosis. In: Maudin, I; Holmes, P.H; Miles, M.A.(Eds.), The Trypanosomiasis. CAB International, UK, PP.331-353.

Majekodunmi AO, Fajinmi A, Dongkum C, Picozzi K, Thrusfield MV, Welburn SC. (2013). A longitudinal survey of African animal trypanosomiasis in domestic cattle on the Jos Plateau, Nigeria: prevalence, distribution and risk factors. Parasite and Vectors 6:239.

TABLE 1: Prevalence of bovine trypanosomosis in Aguata and Orumba South Local Government Areas of Anambra State

TABLE 2: Hematological parameters (Mean ± SEM) of slaughtered cattle in Aguata and Orumba South Local Government Areas of Anambra State

	No exam	Infected (%)
Aguata LGA	140	16 (11.43)
Orumba South LGA	70	6 (8.57)
Overall	**210**	**22 (10.48)**

Sex	**Aguata LGA**		**Orumba South LGA**		**Overall**	
	No exam	**Infected (%)**	**No exam**	**Infected (%)**	**No exam**	**Infected (%)**
Male	86	6 (4.29)	61	5 (7.14)	147	15 (7.14)
Female	54	10 (7.14)	9	1 (1.42)	63	7 (3.33)

Breed	**Aguata LGA**		**Orumba South LGA**		**Overall**	
	No exam	**Infected (%)**	**No exam**	**Infected (%)**	**No exam**	**Infected (%)**
Sokoto Gudali	43	3 (2.14)	31	4 (5.71)	74	7 (3.33)
Red Bororo	14	1 (0.71)	16	1 (1.42)	30	2 (0.95)
White Fulani	83	12 (8.57)	23	1 (1.42)	106	13 (6.19)

Body Condition Score	**Aguata LGA**		**Orumba South LGA**		**Overall**	
	No exam	**Infected (%)**	**No exam**	**Infected (%)**	**No exam**	**Infected (%)**
Thin	5	5 (3.57)	3	2 (2.86)	8	7 (3.33)
Moderate	51	9 (6.43)	23	3 (4.29)	74	12 (5.71)
Good	67	2 (1.43)	40	1 (1.42)	107	3 (1.42)
Excellent	17	0 (0)	4	0 (0)	21	0 (0)

	Aguata LGA		**Orumba South LGA**		**Overall**	
	Uninfected	**Infected**	**Uninfected**	**Infected**	**Uninfected**	**Infected**
PCV	34.85±0.48[a]	25.75±1.28[b]	28.5±0.99[a]	36.3±0.43[b]	35.36±0.33[a]	26.50±0.99[b]
RBC	6.32±0.11[a]	3.12±0.35[b]	5.21±0.26[a]	7.07±0.08[b]	6.55±0.08[a]	3.69±0.33[b]
WBC	10.16±0.43[a]	12.85±1.29[b]	8.90±0.16[a]	7.84±0.11[b]	9.37±0.30[a]	11.77±1.01[b]

[ab] *Rows with different superscripts differ significantly at ($p<0.05$).*