

Prevalence of Protozoan Parasites in Cattle of Madagali Local Government Area of Adamawa State, Nigeria

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Received: 📅 February 04, 2020

Published: 📅 March 02, 2020

Abstract

Study was carried out on sixty (60) clinically suspected indigenous cattle breeds (white Fulani, Adamawa gudali, Sokoto gudali and Red Mbororo). Blood samples were collected to identify parasitic species that were prevalent in the area (Shuwa, Gulak, Duhu, and Mayowandu). Among others, were *Babesia*, *Anaplasma* and *Trypanosoma*. Two thin smears for each cattle blood were prepared and used for identification of blood parasites using normal procedures. The cattle were grouped into different age groups to determine the ages, breeds and sexes susceptible to the blood parasites. Descriptive statistics using SPSS Package, means and percentages were used to analyze the data. For *Anaplasma* infection, (84%) was recorded while *Babesia* recorded (3.33%). No occurrence of *anaplasmosis* was found in ages 1-2 years cattle. However, higher occurrence (36.67%) was recorded for more than 3 years old. *Babesiosis* infection recorded (3.33%) in ages 6 months to 1 year. Infection was uncommon in animals of over 5 year's age. Breed wise infection revealed that Sokoto gudali were mostly affected (84.33%) with *Anaplasma* than red Mbororo (11.66%). Occurrence of *Babesiosis* (3.33%) was relatively higher in Sokoto gudali. From the above results, it can be deduced that Sokoto gudali breed is more susceptible to both *anaplasmosis* and *Babesiosis*. Madagali area is highly endemic for *anaplasmosis* and *Babesiosis*. Occurrences of parasites were higher in summer than winter. Sokoto gudali were more susceptible to these protozoan parasites' than Red Mbororo. It is therefore recommended that more Veterinary attention be given to the Local Government Area in order to improve Livestock production.

Keywords: Prevalence; Protozoan; Parasites; Madagali

Introduction

Nigerian cattle population stood at 13.9 million [1] where 90% are concentrated in the Northern part of the country. Adamawa state has high concentration of cattle. It is estimated that the State has between 2.8-3.5 million cattle [2]. In these areas, disease constraint particularly ectoparasites infestation has hampered cattle production and productivity [3]. Among the ectoparasites, ticks remain one of the most economically important parasites of cattle in tropical and sub-tropical countries [4]. Ticks rank second to insects as vectors of transmissible diseases in man and animals [5]. It is estimated that more than 80% of world cattle is infested by ticks which are known to transmit viral, bacterial and protozoan pathogens causing tick borne diseases like hemorrhagic fever, cowdriosis, Ehrlichiosis, *Anaplasmosis*, *Theileriosis* and *Babesiosis* [3]. Vincenzo et al. [6] reported that in Nigeria, there are presence

of a broad variety of cattle tick species mo veterinary importance. The authors further stated that the presence of each tick species is correlated with the potential occurrence of tick-borne pathogens. The diversity of tick-borne pathogens in Nigeria is higher in feeding than in questing ticks [7]. Therefore, cattle serve as reservoirs for some of the pathogens. In Africa, tick fauna is diverse with about 50 endemic tick species infesting domestic animals [8]. The highest impact on livestock is caused by species belonging to the genera *Amblyomma*, *Hyalomma* and *Rhipicephalus* [3]. Damage is either direct (skin lesions, impairment of growth) or indirect resulting from transmission of pathogens [9]. Bell-Sakyi et al. [10] reported that major impact of this has been associated with *Anaplasmosis*, *Babesiosis* and *Theileriosis* which are prevalent in Africa. Considering the relationship that exists between abundance and tick-borne

infections, the environment in Adamawa State is suitable for the development and survival of various parasites. Considering the fact that ticks are vectors that transmit parasites diseases which include protozoan many measures have been in place to control the vectors so as to reduce the manifestation of these diseases, by diminution of ticks. Treatment of protozoan diseases has been a problem in Madagali Local Government Area. Cost specific treatments have been rendered among the farmers without any laboratory analysis. This study was aimed at creating awareness on different species of ticks responsible for the transmission of protozoan diseases in these animals since they cause economic losses in these livestock. To find out which of the cattle breeds were highly resistance to the protozoan parasites in the area. Suggest ways of reducing the ectoparasites which are responsible for the infection by chemical or mechanical means. Ascertain the prevalence of protozoan parasites in the study area and then find out which of the species among the protozoan are common in the area.

Materials and Methods

The study was carried out in Madagali Local Government Area (LGA) of Adamawa State. Madagali LGA is located between latitudes 10° and 11° and longitudes 12° and 15° of the Greenwich meridian and covers approximately an area of 903 km². The area has an estimated population of 134,827. The vegetation is made up of grasses and some stunted trees in some parts of the area. The rainfall lasts for about 4-5 months in a year with an average rainfall of 700-1000mm per annum. The dry season begins in November and terminates in early June of the following year. Farming is the principal economy of the people in the area. The climate and the rich alluvial soil of the area favours the cultivation of food crops such as Sorghum, Millet, Maize, Rice and cassava. It favours the production of local cash crops such as cowpea, groundnuts, sesame and sugar cane on a large-scale basis. Livestock production is also very important in the study area and is one of the largest concentrations of cattle in Adamawa state. Fishing is a common practice among those living around riverbank areas.

Experimental design

The study was carried out on sixty (60) clinically suspected indigenous cattle breeds which were white Fulani, Adamawa gudali, Sokoto gudali and Red Mbororo). Blood samples were collected to identify parasitic species that were prevalent in the area among others, were *Babesia*, *Anaplasma* and *Trypanosome*. Blood samples were randomly collected from the cattle breeds in each of the district in the study areas (Shuwa, Gulak, Duhu, and Mayowandu).

Experimental procedure

Two thin smears for each cattle blood were prepared. Smears were air dried and fixed with methanol for 3-5 minutes and stained with gemsa stain and examined under microscope (100) with

immersion oil for identification of blood parasites as described by soulsby [11]. The cattle were grouped into different age groups to determine the ages, breeds and sexes susceptible to the blood parasites. Full blood sample were collected through jugular veins by ear punching with 18 gage needles, from Fulani herd, after proper restrains by the herdsman. The test tube were labeled properly, dated and placed in a cooler with complete ice park. EDTA was carefully placed with the uncoagulated blood.

Data analysis

Descriptive statistics using SPSS Package with means, totals and percentages were used to describe the prevalence of protozoan parasites in cattle in the study area.

Results and Discussion

For *Anaplasma* infection, (84%) was recorded in this study (Table 1). This supports the earlier report of *Anaplasma* infection in Bangladesh [12] 85%. *Babesia* infection of (3.33%) was recorded in this study which is similar to that of Samad et al. [13] who recorded 3.28% subclinical prevalence of *Babesia* infection in cattle of the selected milk vita project area of Bangladesh. Shahidulah [14] recorded a comparatively lower (2.29%) prevalence rate of such infections on microscopic peripheral blood smear examination whereas Barnerjee et al. [15] detected higher (14.54%) prevalence of *Babesia* in cattle of Bangladesh. From Table 1, it was revealed that no occurrence of *anaplasmosis* found in age of 1-2 years cattle. However, higher occurrence (36.67%) was recorded in cattle of more than 3 years old. Age wise occurrences support the report of Chakraborti [16] who reported that animals over 3 year's age are highly affected by *anaplasmosis*. For *Babesiosis* infection, (3.33%) was found in age of 6 months to 1 year which supported the report of Chakraborti [16] who recorded similar infection in animal of 6-12 months age group. However, infection was uncommon in animals of over 5 year's age. Breed wise infection (Table 2), revealed that Sokoto gudali cattle were mostly affected (84.33%) with *Anaplasma* than red Mbororo cattle (11.66%). Breed wise susceptibility to *anaplasmosis* revealed in this study supported the report of Chakraborti [16]. On the contrary, occurrence of *Babesiosis* (3.33%) was relatively higher in Sokoto gudali cattle. Breed susceptibility of *Babesiosis* recorded in this study supported the report of Chakraborti [16]. From the above results, it can be deduced that Sokoto gudali breed is more susceptible to both *anaplasmosis* and *Babesiosis*. Table 3 shows comparative prevalence of protozoan parasites in the study area. Out of all the animals (60) examined 22 (91.67%) were infected by *Anaplasma* while that of *Babesia* was 2 (8.33%). From this, it can be seen that the prevalence of *Anaplasma* in this study is comparatively higher than that of *Babesia*. This is in consonance with previous report on *Anaplasma* by Chakraborti [16] that cattle are more susceptible to *Anaplasma* than *Babesia* parasite.

Table 1: Age wise occurrence of *Anaplasmosis* and *Babesiosis* (n=60) of Madagali Local Government Area.

Age	No cattle Examined	<i>Anaplasmosis</i>		<i>Babesiosis</i>	
		No	%	No	%
6 months to 1 year	05	00	00	02	3.33
1 year to 2 years	07	00	00	00	00
2 years to 3 years	14	07	11.66	00	00
> 3 years	34	22	36.76	00	00
Total	60	29	84.33	02	3.33

Table 2: Breed susceptible *Babesiosis* and *Anaplasmosis* in cattle of Madagali area.

Breed	No of cattle examined		<i>Anaplasmosis</i>		<i>Babesiosis</i>	
	NO	%	No	%	No	%
Adamawa gudali	05	8.3	00	00	00	00
Sokoto gudali	34	56.7	22	36.67	02	3.33
Bunaji	07	11.7	00	00	00	00
Red bororo	14	23.3	07	11.66	00	00
Total	60	100	29	84.33	02	3.33

Table 3: Comparative analysis of prevalence of protozoan parasites in study area.

Parasites	No. Positive	% prevalence
Anaplasma	22	91.67
Babesia	02	8.33
Total	24	100.00

The results of sex and breed wise comparative prevalence of protozoan parasites in the study area are presented in Table 4. The result of this study showed that sex prevalence of *anaplasmosis* was significantly ($P < 0.05$) different between male and female animals. Talukdar and Karim [12] reported a significant difference ($P < 0.05$) in the infection prevalence of male (48.33%) and female (47.83%) animals. Sex dimorphism in protozoa parasites has been previously reported by Barnerjee [15] and Chakraborti [16]. Our current findings may not have supported this theory because, occurrence of any disease is dependent on many factors of which sex is just

one of them. Some other host or other related factors than sex could therefore have played a role in influencing the susceptibility of the animals to infection. Tadesse and Sultan [17] reported that the prevalence of diseases (tick infestation) significantly ($P < 0.01$) varies with breed and body condition of cattle. There is highly ($P < 0.01$) significant difference in the prevalence of tick infestation between breeds [18]. The local breeds are highly ($P < 0.01$) infested [17]. Salatin reported that cattle are more susceptible to protozoan diseases because they are spread by a resistant infective stage of the parasite called oocyte that can survive outside the host animal.

Table 4: Sex and Breed wise comparative prevalence of protozoan parasites of cattle.

Breed	Female		Male		Total	
	No examined	No positive	No examined	No positive	No exam	No pos
Adama gudali	3	00	2	00	5	00
Sokoto gudali	18	9	16	36	34	22
Bunaji	4	00	3	00	7	00
Red bororo	8	3	6	4	14	7
Total	23	11	27	17	60	29

Conclusion

The present study suggests that Madagali area is highly endemic for *anaplasmosis* and occurrences of parasites was highly in summer, Sokoto gudali cattle was highly susceptible to these protozoan parasites' than Red Mbororo.

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DOI: [10.32474/SJFN.2020.02.000147](https://doi.org/10.32474/SJFN.2020.02.000147)



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