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

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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 no 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 infecting 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 4-5months 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 contributors to the economy. The area 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 Trypanosoma. 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 gesma stain and examined under microscope (100) with immersion oil for identification of blood parasites as described by souldy [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 restraints by the herdsmen. 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. Shahidullah [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 was recorded 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 Sokota 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 | Anaplasmosis | Babesiosis |
|----------------|--------------------|--------------|------------|
|                |                    | No | %  | No | %  |
| 6 months to 1 year | 05                 | 00 | 0  | 02 | 3.33 |
| 1 year to 2 years  | 07                 | 00 | 0  | 00 | 0    |
| 2 years to 3 years | 14                 | 07 | 11.66 | 00 | 0    |
| > 3 years        | 34                 | 22 | 36.76 | 00 | 0    |
| 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 | Anaplasmosis | Babesiosis |
|----------------|-----------------------|--------------|------------|
|                |                       | No | %  | No | %  |
| Adamawa gudali | 05                    | 00 | 0  | 00 | 0    |
| Sokoto gudali  | 34                    | 22 | 36.67 | 02 | 3.33 |
| Bunaji          | 07                    | 00 | 0  | 00 | 0    |
| Red bororo     | 14                    | 07 | 11.66 | 00 | 0    |
| Total          | 60                    | 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. Tukulder 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      | 0    | 2     | 00       | 5        | 00     |
| Sokoto gudali  | 18     | 9    | 16    | 3        | 34       | 22     |
| Bunaji          | 4      | 0    | 3     | 0        | 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.

References

1. Musa HL, Jajere SM, Adamu NB, Atsanda, NN, Lawal JR, et al. (2014) Prevalence of tick infestation I different breeds of cattle in Maiduguri, North Eastern Nigeria. Bangladesh Journal of Veterinary Medicine 12 (2): 161-166.
2. Ardo MB, Tukur AL (1999) Livestock. Adamawa State in Maps. Paraclete Publishers, Yola, Adamawa State, Nigeria.

3. Rajput ZI, Hu S, Chen W, Orji AG, Xiap C (2006) Importance of ticks, their chemical and immunological control in livestock. J Zhejiang Univ Sci B 7(11): 912-921.

4. Jongejan F, Uilenberg G (2004) Ticks and control methods In: Blancou J (Ed.), Ectoparasites of animals and control methods. Rev Sci Tech 13(4): 1201-1226.

5. Suti V, Yadav CL, Kummar RR, G Rajat (2007) Seasonal activities of Boophilus microplus on large ruminants at an organized livestock farm. Journal of Veterinary parasitology 21(2): 125-128.

6. Vincenzo L, Kim P, Barend MC, Ayodele M, Charles D, et al. (2013) Ixodid ticks of traditionally managed cattle in central Nigeria where Rhipicephalus, (Boophilus) microplus do not dare. Parasit Vectors 6: 171.

7. Anna LR, Olatunbosun AG, Judith MH, Muller CO (2012) Pathogen prevalence in ticks collected from vegetation and livestock in Nigeria. Appl Environ Microbiol 78(8): 82562-82568.

8. Walker AR (2003) Ticks of domestic animals in Africa: A guide to identification of species. Bioscience of Edinburgh, Scotland.

9. Simunza M, Weir CE, Tait A, Shiels B (2011) Epidemiological analysis of tick-borne diseases in Zambia. Vet Parasitol 175: 331-342.

10. Bell Sakyi L, Koney EB, Dogbey O, Walker AR (2004) Incidence and prevalence of tick-borne hemoparasites in ruminants in Ghana. Vet Parasitol 124: 25-42.

11. Soulsby EJL (1982) Helminths, Arthropods and Protozoan of Domesticated Animals. 7th edn, Bailiere Tindall and Cassell Ltd, London.

12. Talukdar MH, Karim MJ (2001) Subclinical Anaplasma infection in crossbred cattle in Bangladesh. Bangladesh Veterinary Journal 35: 159-160.

13. Samad MA, Bashar SA, Shahidullah M, Ahmed MU (1989) Prevalence of haemoproteozoan parasites in cattle of Bangladesh. Indian Journal of Veterinary Medicine 13: 50-51.

14. Shahidullah MH (1983) Studies on haemoproteozoan disease of goats and cattle with their vector ticks. M.Sc. Thesis, Submitted to the Department of Medicine, Bangladesh Agricultural University, Mymensingh.

15. Banerjee DP, Prasad KD and Samad MA (1983) Seroprevalence of Babesia Bigemina infection in cattle in India and Bangladesh. Indian Journal of Animal Sciences 53: 431-433.

16. Chakrabarti A (2002) Textbook of preventive Veterinary Medicine. 3rd edn, Kalyani Publishers New Delhi, India pp. 683.

17. Tadesse B, Sultan A (2014) Prevalence and distribution of tick infestation in cattle at Shewa, Ethiopia. Livestock Research for Rural Development 26(8): 126-129.

18. Salatin J (2012) Protozoal diseases in cattle. Organic farming.

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