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**Serological Survey of *Brucella* antibodies in cattle herds in Yobe State, Nigeria**

\*Adamu1, S. G., Tijjani1 A. O., Atsanda1 N. N., Sadiq1 M. A., Adamu1 N. B.,

Hambali1 I. U., Jajere1 M. S., Bello2 T. A.

1. Department of Veterinary Public Health and Preventive Medicine,

Faculty of Veterinary Medicine, University of Maiduguri.

2. Ministry of animal and fishery development, Maiduguri, Borno State

\*Correspondence: Email: [gsadamu@yahoo.com](mailto:gsadamu@yahoo.com) Tel. +2348035383010

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| **Abstract**  Serological survey of *Brucella* antibodies in cattle herds was carried out in all the five agricultural zones of Yobe state, Nigeria. Four hundred (400) cattle serum samples from different herds located in all the agricultural zones of the state were screened by Microtitre Serum Agglutination Test (MSAT). One hundred structured questionnaires were also administered to pastoralist herdsmen in the state. Out of the four hundred (400) sera screened, 136(34.0%) was seropositive. Of the 136 seropositive cattle, 32(8.0%) were male while 104(26.0%) were female cattle. There was no significant statistical difference (P>0.05) in the sero-prevalent rates between the male and female cattle screened. The highest specific sero-prevalence of 14.0% was obtained in the age band of 5–6.5years, while the least (1.5%) was obtained in the age band 1–2.5 years. Geidam zone with 12.0% specific sero-prevalence was the highest among all the zones of the state while Damaturu zone recorded the least (3.5%). The white Fulani breed recorded the highest specific sero-prevalence of 15.0% followed by Wadara, 9.5%, Red Bororo 5.5% and Adamawa Gudali 3.5 %. There was no significant statistical difference in the age, breeds and agricultural zones of the state (P>0.05). Also there was no significant statistical association between the sex of the cattle and *Brucella* infection. The study concluded that brucellosis was still endemic in the herds of cattle in Yobe State. The sero-prevalence was higher among females than males and in the adults than in the young cattle studied.  **Key words:** Brucellosis, cattle, sero-prevalence, Nigeria, Yobe |

**Introduction**

Brucellosis is an infectious disease and important public health problem in many parts of the world (1,2). Brucellosis in cattle is caused by a specific bacterium, *B. abortus*, less frequently by *B. melitensis*. This bacterial infection occurs primarily in the reproductive track and lymph nodes of the animal. In Africa brucellosis remains a largely neglected disease with little attention to control and prevention except in South Africa where a successful control policy has been instigated (3). One of the major factors contributing to the spread of the disease is free movement of nomadic pastoralists who are accustomed to the traditional extensive system of management (4).

Brucellosis has been reported in livestock in Nigeria with evidence of the disease in many parts of the country which is usually accompanied by severe economic losses (5,6,7,8,9,10,11,12,13). In Yobe state, earlier reports of brucellosis were carried out in abattoir (14, 15). This study determines the sero-prevalence of *Brucella* infection in cattle herds in Yobe State.

**Materials and methods**

The study was carried out in the five agricultural zones of Yobe State, Nigeria. There are 2 – 4 local government areas (LGA) in each zone. The state is located in the arid-zone of the North-Eastern part of Nigeria within latitude 110 51ꞌ North and longitude 130 10ꞌ East, with a total area of 45,502 square kilometers, and with estimated population of 2,532,395. The state is dry and hot for most part of the year, except in the southern part of the state which has a milder climate (16).

Local government areas in each zone served as sampling frame from where two LGA were selected from each by simple random method. Only camel herds whose owner consented to our request were used. Questionnaire was administered to get information on pastoralist personal data such as age, educational background, family size and type of labour employed. Other information includes herd size, herd medical history and patronage of veterinary services.

Four hundred cattle from all the agricultural zones of the state were sampled. Ten millilitres (10ml) of blood was collected from each of the animal aseptically from the jugular vein, using hypodermic syringe and needles. Each sample was labeled with a number and information on the breed, age, sex, and location of the animals were recorded. Samples were kept overnight at 4°C to allow separation of the serum. It was then centrifuged at 3000 g for 5 minutes. The separated serum was collected in a screw capped plastic vial, coded and kept at -20°C up to the time of the test.

All serum samples were subjected to microtitre serum agglutination test (MSAT) in order to quantify the antibody. This was done according to the method described by Alton *et al* (17).

Data generated from the study were subjected to Chi square analysis for comparison, and Odd ratio (OR) to test association between occurrence of *Brucella* infection and sex, age and breeds of cattle, as well as agricultural zones of the state.

**Results**

One hundred and thirty-six (34.0%) out of 400 cattle screened by MSAT in all the agricultural zones of the state were seropositive to *Brucella* infection. Of the 136 seropositive cattle, 32(8.0%) were male while 104(26.0%) were female cattle. There was no significant statistical difference (P>0.05) in the sero-prevalent rates between the male and female cattle screened and the sex of the cattle does not significantly associates with *Brucella* infection (Table 1).

Table 2 shows the age specific sero-prevalence of *Brucella* antibodies in cattle samples that were tested within the state. The highest specific sero-prevalence of 14.0% was obtained in the age band of 5–6.5 years while the least (1.5%) was obtained in the age band 1–2.5 years. There was no significant statistical difference (P > 0.05) among all the age bands tested. Geidam zone with 12.0% specific sero-prevalence was the highest among all the zones of the state while Damaturu zone recorded the least (3.5%). The findings of the study indicated that there was no significant statistical difference (P>0.05) between the rates of the agricultural zones of the state. No significant statistical association between the sex of cattle and *Brucella* infection was observed in all the agricultural zones of Yobe state (Table 3).

The white Fulani breed recorded the highest specific sero-prevalence of 15.0% followed by Wadara, 9.5%, Red Bororo 5.5% and Adamawa Gudali 3.5 %. There was no significant difference in the sero-prevalence rates between the different breeds screened in the state (P>0.05). There was no significant statistical association between the sex of all the cattle breed screened and *Brucella* infection (Table 4).

Table 1: Sex Specific sero-prevalence of *Brucella* antibodies in cattle herds in Yobe State

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| Number MSAT Odds Ratio 95% C.I on OR  Sex Examined No.(%) Positive Negative χ2  P value (OR) Lower Upper  Male 104 32(8.0) 72 0.4736 0.4913 0.8205 0.5077 1.326  Female 296 104(26.0) 192 1.219 0.7541 1.970  Total 400 136(34.0) 264  Table 2: Age specific sero-prevalence of *Brucella* antibodies in cattle herds in Yobe State  Age Number MSAT  (Years) Examined No.(%) Positive Negative χ2 P value  1 – 2½ 27 6(1.50) 21 5.582 0.6940  3 – 4½ 77 20(5.00) 57  5 – 6½ 155 56(14.00) 99  7 – 8½ 120 45(11.25) 75  9 – 10½ 21 9(2.25) 12  Total 400 136(34.00) 264 |

Table 3: Agricultural zone-specific sero-prevalence of *Brucella* antibodies in cattle herds in Yobe State

Agricultural Number MSAT Odds Ratio 95% CI on OR

Zone Sex Examined No. (%) Positive Negative χ2  P value (OR) Lower Upper

Male 12 2(0.5) 10 1.512 0.2188 0.2667 0.04905 1.450

Damaturu Female 28 12(3.0) 16 3.750 0.6898 20.386

Total 40 14(3.5) 26

Male 17 4(1.0) 13 0.1407 0.7076 0.6374 0.1755 2.315

Potiskum Female 43 14(3.5) 29 1.569 0.4320 5.698

Total 60 18(4.5) 42

Male 25 8(2.0) 17 0.000 1.0000 1.000 0.3789 2.639

Gashua Female 75 24(6.0) 51 1.000 0.3789 2.639

Total 100 32(8.0) 68

Male 29 11(2.7) 18 0.001895 0.9653 0.8919 0.3778 2.106

Geidam Female 91 37(9.2) 54 1.121 0.4749 2.647

Total 120 48(12.0) 72

Male 21 7(1.75) 14 0.01230 0.9117 1.235 0.4245 3.595

Nguru Female 59 17(4.25) 42 0.8995 0.2782 2.356

Total 80 24(6.0) 56

Table 4: Breed specific sero-prevalence of *Brucella* antibodies in cattle herds in Yobe State

Number MSAT Odds Ratio 95% CI on OR

Breeds Sex Examined No. (%) Positive Negative χ2  P value (OR) Lower Upper

Male 40 15(3.75) 25 0.03511 1.0000 0.9319 0.4456 1.949

White Fulani Female 120 47(11.75) 73 1.073 0.5131 2.244

Total 160 62(15.5) 98

Male 29 9(2.25) 20 0.007063 1.0000 0.9621 0.3903 2.371

Wadara Female 91 29(7.25) 62 1.039 0.4217 2.562

Total 120 38(9.50) 82

Male 23 4(1.0) 19 1.019 0.2719 0.4561 0.1354 1.537

Red Bororo Female 57 18(4.5) 39 2.192 0.6508 7.386

Total 80 22(5.5) 58

Male 12 2(0.5) 10 1.512 0.1570 0.2667 0.0490 2.899

Adamawa Female 28 12(3.0) 26 3.750 0.6898 20.386

Gudali Total 40 14(3.5) 36

**Discussion**

The sero-prevalence of 34.0% obtained in this study is considered to be high when compared with 5.7% (15) obtained earlier in the same study area, 6.28% and 5.82% in Ibadan, Nigeria respectively (13, 18), 23.3% in Egypt (19), 5% in Sudan (20), 6.2% in Tanzania (21) and 17.5% in Pakistan (22). However, the prevalence was comparable with 34.64% in Turkey (23). The varied sero-prevalence obtained in the study area agreed with Nuru and Dennis (7), who reported a pattern of low and high prevalence in specific areas of the country and prevalence variability between herds in the same area. The high sero-prevalence obtained could be attributed to non-vaccination against brucellosis, low patronage of veterinary services and pastoralist low level of western education as observed from the analysis of the questionnaires administered. The specific sero-prevalence of 8.0% obtained in the male was lower than 26.0% in the female cattle tested in this study. The higher sero-prevalence among the female than the male cattle studied agreed with earlier reports (11,24) that the foci of infection remain in females, which spread the infection from one animal to another.

The observed higher sero-prevalence among the adult age groups than the younger cattle agreed with earlier reports that young animals tend to be more resistant to *Brucella* infection and frequently eliminate the infection while sexually matured animals are more susceptible (25,24). The older animals also had higher exposure through sexual transmission. The no significant statistical difference between the prevalent rate of the agricultural zones and the breeds of cattle studied in the state may implied that location and breeds of cattle in Yobe state were probably not the factors affecting the occurrence of brucellosis.

In conclusion, this study has confirmed that brucellosis was endemic in the herds of cattle in Yobe State. The sero-prevalence was higher among females than males and in the adult than in the young cattle studied. There should be officially coordinated control programme for brucellosis in livestock in Nigeria.

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