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Serological Survey of Brucellosis in Slaughtered Local Chickens, Guinea Fowls, Ducks and Turkey in North-Eastern Nigeria

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Abstract: Serological survey to determine *Brucella* infection in traditionally managed local chickens, guinea fowl, ducks and turkey in Borno State was conducted using Rose Bengal Plate Test (RBPT) and Microtitre Agglutination Test (MAT). Out of 556 sera from local chicken, 84 from guinea fowls, 50 from ducks and 40 from turkey were examined, the seroprevalence of rates of 10(1.8%), 6(7.1%), 2(5.0%) and zero were obtained from the local chicken, guinea fowl, duck and turkey, respectively by RBPT. While MAT recorded 13(2.3%), 8(9.5%) and 3(6.0%) from local chickens, guinea fowl and duck, respectively. Brucellosis is present in local chickens, guinea fowl and turkey which may serve as source of infection to livestock and humans. Public education and enlightenment campaign to poultry handlers on the dangers, there is need for a large scale epidemiological investigation of the disease in chickens.

Key words: Antibodies, brucellosis, local chickens, North-Eastern Nigeria, seroprevalence

INTRODUCTION

Brucellosis is considered by the Food and Agricultural (FAO), the World Health Organisation (WHO) and the Office International des Epizooties (OIE) as one of the most widespread zoonoses in the world (Schelling *et al*., 2003). It is a major veterinary public health challenge as animals are almost exclusively the source of infection for humans (Bronsvoort *et al*., 2009). There are few reports of serological evidence of avian brucellosis in Nigeria (Bale and Nuru, 1982; Abdu *et al*., 1984). Chickens could be important reservoirs of Brucella organism for man and other animals (Abdu *et al*., 1984). Chickens are kept in most parts of Nigeria due to their nutritional and economic importance (Junaidu *et al*., 2006; Baba *et al*., 1998). The local chickens provide an important source of animal protein as well as income in rural socio-economy with little or no capital investment (Baba *et al*., 1998). Many investigations have indicated that brucellosis is endemic in Nigeria (Halle and Ajogi, 1997; Ocholi *et al*., 2004; Bertu *et al*., 2012; Mai *et al*., 2012). There was no report on the occurrence of brucellosis in chickens in the study area. The aim of this study is to assess the status of brucellosis in local chickens, guinea fowls, turkey and ducks and to highlight the role of chickens in the spread of the disease.

MATERIALS AND METHODS

Study area: Borno State is situated in the Northeastern part of Nigeria. The state lies between latitude 10°N and 13°E and longitude 12°N and 15°E. The state has a total area of 69,436 square kilometers, with a population of 4,151,161 people. It occupies the greatest part of the Chad Basin. The state has two vegetation zones viz: Sahel in the North which is hot and with severe desert encroachment covering most of the Chad Basin areas and Sudan Savannah in the South which is slightly milder. The rainy season normally begins from June-September in the North and May-October in the South with relative humidity of 49%. Borno State shares boundaries with the Republic of Niger to the North, Chad Republic to the North-east and Cameroon to the East. Within the country, the state shares border with Adamawa to the south, Yobe to the West, Bauchi and Gombe to the South-west (GSN, 1994).

Sample collection: Five millilitres of blood was aseptically collected from each slaughtered bird and the collected blood samples were kept in slanted position to aloud the serum separate. The collected samples were centrifuged at 3000 g/5 min and kept at -20°C until use.

Serological tests: The serological tests used were Rose Bengal Plate Test (RBPT) and Microtitre Agglutination Test (MAT).

Rose bengal plate test: This was carried out using standard Rose Bengal Plate Test antigen obtained from Veterinary Laboratory Agency, Weybridge Surrey, UK, according to the method describe by Alton *et al*. (1988). Briefly, 30 µL of test serum was placed on a white ceramic tile and the same volume of 30 µL of the RBPT antigen was placed beside the test serum. The two were

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mixed thoroughly with a sterile applicator stick. The mixture were then rocked manually for 4 min and then examined for agglutination. Samples that showed samples that showed distinct agglutination were recorded as positive while those with no sign of agglutination were recorded negative.

Microtitre agglutination test: This test is a modification of serum agglutination test (Gaultney *et al*., 1971). Ringed U-bottom microtitre plate was marked off with 8 rows of 12 wells each and 12 columns of 8 wells. Eight (8) serum samples were assigned to each plate. The microtitre serum agglutination test was performed using standardized *Brucella abortus* antigen obtained from Veterinary Laboratory Agency, Weybridge Surrey, UK. The antigen was diluted: 1 mL of antigen added to 9 mL of normal saline to have ratio 1:10 dilution. Fifty microliters (50 µL) of phenol saline diluents was added into 2 wells through 5 of each rows, 50 µL of serum sample was added into each of the wells 1 and 2 making well 1 to have 50 µL of serum only and well 2 have 100 µL of serum and phenol saline.

RESULTS

Total of 730 samples from local chickens, guinea fowl, ducks and turkeys were sampled for this study. Out of this number 18(2.5%) tested positive for RBPT and 24(3.3%) for MAT. Out of 556 local chickens examined by RBPT 10(1.8%) and 13(2.3%) by MAT were positive. Out of 84 samples examined from guinea fowls 6(7.1%) and 8(9.5%) were found to be positive for RBPT and MAT, respectively. Out of 50 samples examined from ducks 2(5.0%) and 3(6.0%) were found to be positive for RBPT and MAT respectively. All the turkeys were negative for the tests conducted (Table 1). On sex distribution, out of 18(2.5%) RBPT positive samples, 11(2.3%) were from males, while 7(2.6%) were from females. Out of 24(3.3%) MAT positive samples, 15(3.4%) were from males, while 9(3.4%) were from females respectively (Table 2).

Based on location, out of 730 samples collected and examined, of 160 samples from Konduga 2(1.3%) and 4(2.5%) were positive by RBPT and MAT, from Mafa, 4(2.2%) and 6(3.3%) were positive by RBPT and MAT out of 180 samples tested. Out of 190 samples tested from Monguno, 6(3.2%) and 7(3.7%) were positive by RBPT and MAT, respectively, while 6(3.0%) and 7(3.5%) were positive by RBPT and MAT out of 200 samples tested (Table 3).

Table 1: Seroprevalence of brucellosis in slaughtered local chickens, ducks, guinea fowl and turkeys in Borno State based on species

Species	No. of examined	RBPT No. (%) +ve	MAT No. (%) +ve
Local chickens	556	10(1.8)	13(2.3)
Guinea fowl	84	6(7.1)	8(9.5)
Ducks	50	2(5.0)	3(6.0)
Turkeys	40	00	00
Total	730	18(2.5)	24(3.3)

Table 2: Seroprevalence of brucellosis in slaughtered local chickens, ducks, guinea fowl and turkeys in Borno State based on sex

Sex	No. of Examined	RBPT No.(%) +ve	MAT No.(%) +ve
Male	469	11(2.3)	15(3.2)
Female	261	7(2.6)	9(3.4)
Total	730	18(2.5)	24(3.3)

Table 3: Seroprevalence of brucellosis in slaughtered local chickens, ducks, guinea fowl and turkeys in Borno State based on location

Location (LGAs)	No. of Examined	RBPT No.(%) +ve	MAT No.(%) +ve
Konduga	160	2(1.3)	4(2.5)
Mafa	180	4(2.2)	6(3.3)
Monguno	190	6(3.2)	7(3.7)
Jere	200	6(3.0)	7(3.5)
Total	730	18(2.5)	24(3.3)

DISCUSSION

The result of this study suggested that brucellosis is present in poultry in the Northeastern Nigeria. Most of the poultry sampled were local which are on free range with other animals such as cattle, sheep and goats. The local poultry were closed to the people at home, since local birds are not usually vaccinated against brucellosis, the high antibody obtained in some of these birds could be due to natural infection as observed by Chukwu and Boniface (1988). *Brucella* infection could spread from chicken to chicken and to other birds and livestock through infected chicken faeces, thus presence of *Brucella* reactors in local chicken, ducks, guinea fowl and turkeys on free range is of great public importance since apartment are shared between humans and animals in most communities in the rural areas (Shehu, 1999). Infected chickens have been reported to shed the organism in their droppings (Samakabadi *et al*., 2008; Abdallah *et al*., 1984). When utensils smeared with leftover food are littered around the house, the chickens have access and in the process may contaminate these utensils with their droppings (Gugong *et al*., 2012). This may be potential source of infection for the household if the utensils are not properly washed. The droppings also pose a risk for humans especially as chicken faeces is commonly gathered for use as manure and the organism may be inhaled in form of aerosol or dust during the process (Gugong *et al*., 2012). Public enlightenment campaign to poultry owners, practicing good hygiene, the use of protective clothing when coming in contact with poultry and poultry products, the rearing of chickens together with other livestock species such as cattle, sheep and goats should be discouraged in order to minimize the chances of getting infected by brucellosis causing organism. There is urgent need to implement sufficient control and eradication policies to stop the spread of brucellosis in cattle, sheep and goats, since they may be likely major source of *Brucella* organisms for poultry.

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