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Seroprevalence of Brucellosis in Prison Farm in Sokoto, Nigeria*

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Abstract: A herd of cattle, flock of sheep and goats and Prison inmates in Sokoto Prison farm were investigated for evidence of brucellosis. Serum samples obtained from cattle, sheep, goats and humans were serologically assessed using Rose Bengal Plate Test (RBPT) Serum tube Agglutination Test (SAT) and competitive Elisa (compelisa). Similarly, Milk Ring Test (MRT) was carried out using Milk sample. Twenty-eight Prison inmates were tested for Brucella antibodies. An overall prevalence of 32.20% was recorded in the herds. 16 out (40%) of the 40 cows were positive while 2(20%) of the 10 bulls tested were positive and 1(2%) out of the 3 females calves was founds to be positive. Sokoto Gudali was the breed with the highest prevalence (37.58%), while white Fulani recorded a prevalence of 25%. None of the 3 Azuwarq breed was positive to Milk Ring Test. An overall prevalence of 22.35% was recorded in sheep while an overall prevalence of 30.76% was recorded in goats. Two (7.14%) out of the 28 Prison inmates were found to be positive. It is recommended that milk and milk product from seropositive animals should not be consumed. Extra hygiene measures are also recommended among others.

Key words: Brucellosis, farm, human, prison, seroprevalence

INTRODUCTION

Brucellosis is a contagious disease primary affecting cattle, swine, sheep goats, dogs and humans. It occasionally affects horses and camels. It has been reported worldwide and is endemic in Nigeria (Atsanda and Agbede, 2001; Olayinka and Ogundipe, 2001; Samuel, 2003; Junaidu and Garba, 2006). Although brucellosis is a notifiable disease in Nigeria, the incidence, prevalence and distribution of the disease are difficult to determine as the system of disease surveillance and reporting is fragmentary and inefficient (Ocholi *et al*., 1993).

Humans get infected by consuming unpasteurized milk and milk products of infected animals and direct contact of a bruised skin of people handling brucella infected products unhygienic attitude of animal handlers also lead to spread of the disease (Ajogi *et al*., 2002).

Prison inmates attached to the Sokoto Prison farm are involved in rearing the animals. They also partake in the collection of milk and clearing of the surroundings. Milk and milk products from the farm are also processed for human consumption. This study is aimed at determining the status of brucellosis in the farm and suggests some recommendations that will guard both the animals, inmates and other workers against the disease.

MATERIALS AND METHODS

The Sokoto Prison farm where this study was conducted in 2005 is located about 35 km away from the Sokoto State Capital. All the animals and Prison inmates in the farm were screened. These

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Table 1a and 1b: Herd composition of animals samples in prison farm in sokoto

Table 1a:

Cattle	WF	AZ	SG	Total
Cows	10	3	27	40
Bulls	2	0	8	10
Bulls calves	1	0	3	4
Female calves	3	0	2	5
Total	16	3	49	59

WF: White Fulani; AZ: Azuwarq; SG: Sokoto Gudali

Table 1b:

Sheep	Uda	Balami	Yankasa	Total
Ram	11	2	8	21
Ewe	20	7	12	39
Lamb	6	1	9	16
Total	37	10	29	76

Table 1c: Sex and Breed distribution of goats in the prison farm

Breed	Sokoto red	Sahel	Cross	T/N
Doe	38	16	6	60
Buck	12	6	1	19
Kid	10	2	-	12
Total	60	24	2	91

include 58 cattle, 76 sheep, 91 goats and 28 human beings. The breeds of cattle are 40 Sokoto Gudali, 16 white Fulani and Azuwarq. In the breed of sheep, there are 37 Udah, 10 Balami and 29 Yankasa. The breeds of goats are Sokoto Red 60, Sahel 24 and Cross 7. All the 28 Prison inmates are males (Table 1a-c).

Blood was collected from the jugular vein of cattle, sheep and goats and cephalic vein of humans into clean and labeled universal bottles and allowed to clot. The sera were separated from the collected blood and stored at 20°C.

Milk samples were collected from lactating cows and tested by Milk Ring Test as described by Alton *et al*. (1975). All drop of *Brucella abortus* stained antigen were stirred on a clear plate with the test serum using a sterile tooth pick and stirred for four minutes. Formation of distinct pink granules after four minutes were recorded as positive evidence of *Brucella abortus* antibodies. Same procedure was carried out using *Brucella melitencis* stained antigen for the sera of sheep and goat.

All the serum reacted positive to RBPT was subjected to SAT as described by Morgan (1967). The standardized antigen was diluted 1:20 with 0.5% carbol phenol saline. The serial dilutions of the test sera were covered then incubated at temperatures of 37°C for 21 h. The titre of 1:40 and above was recorded as positive.

Competitive Elisa (Compelisa). The competitive Elisa kit was obtained from Veterinary Laboratory Agency Weybridge, United Kingdom. The reagents in the kit were reconstituted as directed by manufacturers. These include diluting buffer, washing solution, stopping solution, conjugate and control sera. The test procedure was carried out as instructed by the manufacturers.

RESULTS

Table 1 shows the herd composition in the farm. In the herd of cattle there are 40 cows, 10 bulls, 4 bull calves and 5 female calves. In the case of breed there are 40 Sokoto Gudali, 16 white Fulani and 3 Azuwarq. In the flock of sheep, there were 21 rams, 39 sheep and 16 lamb while for goats there were 60 doe, 19 buck and 12 kid.

Table 2a: Seroprevalence of brucellosis in cattle

Cattle	T/N	RBPT	SAT	Compelisa
Cows	40	16 (40.0)	15 (37.5)	16 (40)
Bulls	10	2 (20.0)	2 (20.0)	2 (20)
Bulls calves	4	0 (0.0)	0 (0.0)	0 (0)
Female calves	5	1 (20.0)	1 (20.0)	1 (20)
Total	59	19 (32.20)	17	19

Values in parenthesis are shown in percentage

Table 2b: Seroprevalence of brucellosis: Breed distribution

Breeds	T/N	No. of positive	Prevalence
Sokoto gudali	40	15	37.5
White fulani	16	4	25.0
Azuwarq	3	0	0.0
Total	59	19	

Values in parenthesis are shown in percentage

Table 3a: Seroprevalence of Brucellosis in Sheep

Sheep	N	RBPT	SAT	Compelisa
Ram	21	6 (28.57)	6 (28.57)	6 (28.57)
Sheep	39	8 (20.51)	8 (20.51)	8 (20.51)
Lamb	16	3 (18.75)	3 (18.75)	3 (18.75)
Total	76	17 (22.36)	17 (22.36)	17(22.36)

Values in parenthesis are shown in percentage

Table 3b: Seroprevalence of Brucellosis: Breed distribution

Breeds	N	+ve	+ve (%)
Uda	38	9	24.32
Balami	10	2	20.00
Yankasa	29	6	20.68
Total	96	17	22.36

Results indicated that a seroprevalence of 32.20% was recorded in the herd of cattle (Table 2a), 40 cows, 16 (40%) were found to be positive, 2 (20%) out of the 10 bulls tested were positive while 1 (20%) of the 5 female calves was positive. None of the bull calves was positive. On breed distribution, 15 out of 40 Sokoto Gudali were positive giving a prevalence of 37.5% and out of the 16 white Fulani 4(25%) were positive. However none of the Azuwarq tested positive (Table 2b). Result of Milk Ring Test showed that 4 out of 15 samples (26.66%) were positive (Table 3a).

Results on sheep showed that an overall prevalence of 22.36% was recorded, 6(28.57%) out of the 21 rams tested were positive. Out of the 39 sheep tested 8(20.51%) were positive while 3(18.75%) out of the 16 lambs were positive.

On breed distribution, the highest prevalence was recorded in the Udah breed with 9(24.32%) out of 37 screened testing positive. This was followed by Yankasa with 6(20.68%) out of the 29 tested. The least prevalence was found in the Balami breed with 2 positive (20%) out of 10 tested (Table 3b).

Results on goats indicated an overall prevalence of 30.76% for *Brucella abortus,* out of the 60 does screened 17 (28.33%) were positive. Nine (47.35%) out of the 19 bucks screened were positive while (16.66%) out of 12 kids were positive. Results on RBPT melitensis indicated a prevalence of 10% in doe, 10.52% in buck and an overall prevalence of 7.69% (Table 4a).

On breed distribution, Sokoto Red recorded a prevalence of 31.66 and 10% using RBPT abortus and melitensis, respectively. Sahel had a prevalence of 33.33% *Brucella abortus* and 8.33% for *Brucella melitensis*. The cross breed had a prevalence of 14.28% (RBPT abortus) (Table 4b).

Humans out of the 28 Prison inmates screened for *Brucella abortus* and *Brucella melitensis* using RBPT SAT and Compelisa only 2 tested positive for *Brucella abortus.*

Table 4a: Seroprevalence of Brucellosis in goats

Goat	T/N	Compelisa	RBPT (Abortus)	SAT (Abortus)	RBPT Melitensis	SAT Melitensis	Compelisa
Doe	60	17 (28.33)	17 (28.33)	15 (25.00)	6 (10.00)	6 (10.00)	6 (10.00)
Buck	19	9 (47.36)	9 (47.36)	7 (36.80)	2 (10.52)	2 (10.52)	2 (10.52)
Kid	12	2 (16.66)	2 (16.66)	2 (16.66)	0.00	0.00	0.00
Total	91	28 (30.76)	28 (20.76)	24 (26.37)	24 (26.37)	24 (26.37)	24 (26.37)

Values in parenthesis are shown in percentage

Table 4b: Seroprevalence of Brucellosis: Breed distribution

Cattle	T/N	Abortus	Melitensis	Total
Sokoto eed	60	19 (31.66)	6 (10.00)	25
Sahel	24	8 (33.53)	2 (8.33)	10
Cross (Sokoto Red + Sahel	7	1 (14.28)	0	1
Total	91	28	8	36

Values in parenthesis are shown in percentage

DISCUSSION

The seroprevalence of 33.20% in cattle, 22.36% sheep and 30.76% in goats and 7.14% in humans suggest extensive and established infection of brucellosis in the Prison farm. This indicates that brucellosis is endemic not only in the Prison farm but also in other farms within the area. The result could be higher than that because even if it is negative the results could be deceptive as observed by Ajogi *et al*. (2002), as *B. abortus* is an intracellular organism and therefore survive in the transitory titres even in isolated episodes of bactereamia and disappearance of titre in animals with latent infection (Meador *et al*., 1986). Seropositive in the bulls, rams and bucks showed cross transmission of infection among sexes. On sex and breed distribution, brucellosis is known to be neither breed nor sex specific (Ajogi *et al*., 2002). The positive test in two of the 28 Prison inmates confirms human infection. Human infection in the farm could results from various sources including contact with infected animals and drinking of raw milk. Test should be conducted to ensure the safety of the milk before consumption.

Similarly, contamination of common grazing lands by infected but apparently clean herd could serve as a source of brucella infection to other herds and the flocks of goats in the farms as observed by Ajogi *et al*. (2002). Prison inmates sent to the farm are usually kept permanently in the farm to serve their sentences. They are engaged in animal husbandary and are therefore subjected to a lot of hazards through contact with animals and other bye products as observed by Ajogi *et al*. (2002). Routine medical check up is not common and when the inmates are sick, zoonotic diseases (such as brucellosis) are unlikely to be considered as one of the differential diagnosis. Similarly random checkup by the authorities to asses the health of the herd is not regularly done thus subjecting the prisoners who serve as herders to a lot of serious public health implications. The clinical diagnosis of brucellosis in man is difficult as the manifestations are non-specific varying from acute febrile illness to low grade chronic disease and may be confused with manifestations of other diseases such as malaria, typhoid fever and even pulmonary tuberculosis (Alausa, 1977).

Brucellosis is a disease of both public health and economic importance. Prison farm authorities have been informed of the results. The inmates have also been educated on the public health consequences of brucellosis, particularly modes of transmission. Medical treatment of the inmates has been recommended. Milk and milk products from seropositive animals were recommended not for human consumption. The slaughtering of the infected animals has also been recommended. Extra hygienic measures and precautions have been recommended. The observations made in the Prison farm highlight the animals and human health implications. It has shown that animals in these farm and other institutional farms are not subjected to routine medical care and that Brucellosis and other zoonotic diseases are likely to be endemic in these farms. This poses a serious threat to human health

particularly of the prison inmates who were sent to work in the farm. Therefore farms particularly those of the prison should be routinely checked for any possible health problem while the workers should be routinely examined for common zoonotic diseases.

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