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Seroprevalence of Brucellosis in Sheep in Sokoto City Abattoir

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Abstract: Serum samples from sheep collected from the Sokoto city abattoir were tested for brucellosis using the Rose Bengal Plate Test (RBPT), the Serum Agglutination Test (SAT) and the Competitive ELISA (*Compelisa*). A sero prevalence rate of 23.61% was recorded. The prevalence was higher among the females (26.71%) than males (15.30%) and also in those within the age band of 12-24 months (26.19%). Out of the three breeds of Udah, Yankassa and Balami, Udah was observed to have the highest prevalence of 30.76%. It is recommended that a large monitoring of the disease in small ruminants as well as mass vaccination should be embarked upon in the State.

Key words: Brucellosis, seroprevalence, sheep, abattoir

INTRODUCTION

Brucellosis in sheep has been reported in most of the major sheep producing regions of the world. In Nigeria, brucellosis investigations in small ruminants have been largely confirmed to goats (Falade *et al*., 1975). Socio-economic and public health significance of brucellosis acquired through sheep and goats have been reported by several investigators in Nigeria for several years (Esuruoso, 1974; Esuruoso and Hill, 1971; Esuruoso and Van Blake, 1972; Falade, 1978, 1980, Falade *et al*., 1975; Okoh, 1982; Okewale *et al*., 1988, Brisibe *et al*., 1993).

In Sokoto State, however, no serological survey work on sheep brucellosis had been done in recent times. In view of the paucity of data on the current status of brucellosis of sheep in the State, further studies in this area in needed. This serological study was carried out in Sokoto metropolitan Abattoir to determine the current status of sheep brucellosis in the metropolis.

MATERIALS AND METHODS

Serological tests: The Rose Bengal Plate Test (SAT) and Competitive Elisa were used in this study. The reagents were obtained from Central Veterinary Laboratory Weybridge, London. The Rose Bengal Plate Test was carried out according to the method described by Alton *et al*. (1975). Equal volume (0.03 mL) of antigen and test serum were mixed on the glass slide and mixed thoroughly with a toothpick hard rocked for 4 min. A sample which showed signs of agglutination was recorded as positive. Similarly serum agglutination test was carried out as described by Alton *et al*. (1975). For each of the samples that was positive for RBPT a two fold dilution of test sera was done from 1:10 i.e., 0.05 mL of serum was mixed with 0.45 mL of phenolized saline. To each of the 0.5 mL tube of phenolized saline-serum, an equal volume of (0.5 mL) of the diluted antigen was added. The tubes containing the antigen-serum mixture was covered, shaken and incubated at 37°C for 24 h. Any serum with agglution at a dilution of 1:40 (Alton *et al*., 1975) and above was recorded as positive.

Competitive (ELISA): The competitive enzyme linked immunosorbent assay kit was obtained from Veterinary Laboratory Agency Weybridge. United Kingdom. The test was conducted according to the manufacturers instructions. Initially the diluting buffer, wash solution, stopping solution, conjugate and controls were reconstituted as directed by the manufacturer. Test serum was added per each well of microtitre plate which has 60 columns (wells). Wells 11 and 12 were used as control.

Twenty milliliter of the negative control was added to well A11, A12, B11, B12, C11 and C12 while another 20 mL of the positive control was added to wells F11, F12, G11, G12, H11 and H12.

D11, D12, E11 and E12 served as conjugated controls. One hundred microliter of the prepared conjugated was then dispersed into all wells. The palate was then shaken with hands for 2 min in order to mix the serum with the conjugated solution. The plate was then covered with the lid and incubated at room temperature for 3 min. The content of the plate was then discarded and rinsed 5 min with washing solution and then dried. One hundred microliter of the substrate chromogen solution was added to all wells. The plate was kept at room temperature for 10 min. The colours of the test well were compared with negative and positive controls and the results recorded.

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Table 1: Breed distribution of RBPT, SAT and Compelisa positive samples

Breed	No. of Screened	No. of positive (RBPT) (%)	SAT (%)	Compelisa (%)
Udah	312	96 (30.76)	87 (27.88)	96 (30.76)
Yankassa	270	52 (19.25)	46 (17.03)	52 (19.25)
Balami	138	22 (15.94)	20 (14.49)	22 (15.94)
Total	720	170	153	170

Table 2: Sex distribution of RBPT, SAT and Compelisa positive samples

Breed	No. of screened	No. of positive (RBPT) (%)	SAT positive (%)	Compelisa (%)
Female	524	140 (26.71)	132 (25.1)	140 (26.71)
Male	196	30 (15.30)	21 (10.71)	30 (15.30)
Total	720	170	153	170

Table 3: Age distribution of RBPT, SAT and Compelisa positive samples

Breed	No. of screened	No. of positive (RBPT) (%)	SAT positive (%)	Compelisa (%)
0-12 months	144	35 (24.30)	31 (21.52)	35 (24.30)
12-24 months	336	88 (26.19)	80 (23.80)	88 (26.19)
>24 months	240	47 (19.58)	42 (17.5)	47 (19.58)
Total	720	170	153	170

RESULTS

Results obtained indicated that 170 (23.61%) out of 720 screened samples were positive for RBPT and Competitive Elisa while 153 (21.23%) were positive for SAT. On breed distribution, Udah had the highest prevalence of 30.76% where 96 out of 312 screened samples were positive for RBPT and Competitive ELISA and 87 out of the number were positive using SAT i.e., a prevalence of 27.8%. Yankassa had a prevalence rate of 19.255 and 17.03% using RBPT and SAT respectively while Balami had the least prevalence of 15.94% using RBPT and 14.49% using SAT (Table 1).

On sex distribution 140 out of the 524 female samples screened were positive using RBPT i.e., a prevalence of 26.71% whereas 132 i.e., 25.19% were positive using SAT. There were 30 positive samples out of the 196 male samples screened using RBPT i.e., a prevalence of 15.30% while 21 i.e., 10.71% were positive using SAT (Table 2).

On age distribution: Thirty five out of 144 samples were positive in the age band of 0-12 months i.e., a prevalence 24.30% using RBPT and 31 i.e., 21.52% using SAT. For the 12-24 months age band 88 i.e., 26.19% out of 336 screened samples were positive using RBPT and 80 (23.80%) using SAT. For those sheep above 24 months of age 47 (19.58%) out of 240 screened samples were positive using RBPT while 42 (17.5) were positive using SAT (Table 3).

DISCUSSION

The prevalence rate of *Brucella* infection in slaughtered sheep were 23.61 and 21.23% by RBPT and SAT, respectively. This high prevalence rate is an indication that brucellosis exist in sheep in this part of the country just as it is throughout Nigeria as shown by previous studies of Okewale *et al.* (1988), Okoh (1982) Falade *et al.* (1975), Falade (1978, 1980) and Brisibe *et al.* (1993).

The results showed that the seroprevalence is higher in females than males. This is consistent with the known epidemiology of the diseases that due to epididymitis and hardening of the scrotum in male animals, they may be animals in which apart from abortion, there may be no other sign of disease (Brisibe *et al.*, 1993). Similarly, a brucella growth supporting substance which occurs in higher concentration in the placenta and foetal fluids of females than in seminal vesicles and testis of males (Keppie *et al.*, 1965) could probably be responsible for the observed disparity in infection rates between the sexes. The higher prevalence recorded in the age band of 12-24 months could results from the fact that sexually matured animals are much more susceptible to infection regardless of gender as reported by Dwight and Yvan (1999).

The high prevalence rates obtained in the study indicates that infected sheep constitute a public health hazard to sheep owners, handlers, consumers of the sheep meat, milk and milk products. sheep owners and butchers may possibly be harboring the infections. With an estimated economic loss of 9.8 million annually to brucella infection in sheep and goat and 148.8 million in bovine in 1975 as reported by Esuruoso, makes this high economic loss and public health implications of the disease to warrant the introduction of mass vaccination for small ruminant. This is in addition to inclusion of small ruminants in sero-monitoring exercise both of the State and National levels, as well as public enlightenment campaign against the socio-economic and public health implication of the disease.

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