



Serological Survey of Antibodies against *Brucella* Organisms in One Humped Camel (*Camelus dromedarius*) Herds in the Lake Chad Area of Borno State, North Eastern Nigeria.

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SUMMARY

Sero-prevalence of brucellosis in the one-humped camel (*Camelus dromedarius*) was carried out in the Lake Chad area of Borno state. A total of two hundred and fifty four (254) sera samples collected from adult camels in herds located in the Lake Chad Area of Borno state, North eastern Nigeria, were tested using Rose Bengal Plate test (RBPT) and Microtitre Serum Agglutination Test (MSAT). Twenty four samples (9.4%) were positive by both RBPT and MSAT, out of which 10 (3.9%) and 14 (5.5%) were males and female respectively. There was no statistically significant association between sex and positive serological reaction ($P > 0.05$).

KEY WORDS: Sero-prevalence; Brucellosis; Camels; Lake Chad; Nigeria

INTRODUCTION

Brucellosis is a zoonosis caused by non-motile aerobic gram negative coccobacilli, which is transmitted to the human population mostly as an occupational disease or through the ingestion of raw cattle, goat or sheep (including camel) milk and/or unpasteurized dairy products (Young, 1995). Camel husbandry is vital for numerous pastoralist groups in Africa and Asia (Abass and Agab, 2002; McDermott and Arimi, 2002). Camel herds are predominantly in the hands of pastoralist or agro-pastoralists relying on transhumance or nomadism moving along the arid and semi-arid zones crossing international boundaries (Farah, 2004; Abbas and Omer, 2005). The camel's ability to survive and produce under harsh environmental conditions has made it possible to use marginal and desertified ecosystems; and over the centuries, the camel has been a symbol of stability for the pastoralists in the arid zones of

the world (Abbas *et al.*, 1992). Camels are also believed to be a reservoir for brucellosis (Ismaily *et al.*, 1988). The one-humped camel (*Camelus dromedarius*) may serve as a potential source of *Brucella* infection to other livestock and humans in Nigeria (Ajogi and Adamu, 1998). Risk factors for infection include: the handling of contaminated animal products such as unpasteurized milk, and milk products (including cow, goat and camel), meat ("Suya and Kilishi") (Bale, 1991), animal by-products and handling cultures of *Brucella spp* in laboratories (Ajogi and Adamu, 1998, Salari, 2002; FAO, 2003). Camel meat and milk is increasingly important as a source of protein for the human populace; this highlights the potential importance of camels as reservoir and source of brucellosis for humans (Kudi *et al.*, 1997; Adamu and Ajogi, 1999). The initial report on prevalence of brucellosis among camels in Nigeria was based on serological evidence by Okoh (1979), where a prevalence rate of 1% was reported in slaughtered camels in Kano. Later a prevalence of 7.5% was found among camels in Kano by the use of MSAT (Kudi *et al.*, 1997). Junaidu *et al.* (2006) carried out a sero-prevalence study of brucellosis in camels slaughtered in Sokoto State abattoir of North-western Nigeria. In that study, out of the 329 blood samples screened over a period of 52 weeks, 37 (11.42%) were found to be positive by Rose Bengal Plate test (RBPT), serum agglutination test (SAT) and competitive enzyme linked immunosorbent assay (cELISA). Adamu *et al.* (1997) in studies on seroepidemiology of brucellosis in one-humped camel (*Camelus dromedarius*) from three northern states reported prevalence rates of 12.5%, 18.6% and 25.5% in Kano, Kaduna and Borno States respectively. Prevalence rates of

9.5% (Zaria *et al.*, 1990) and 1.8% (Egbe-Nwiyi *et al.*, 1999) were reported in camels slaughtered in Maiduguri Borno state North-Eastern Nigeria. There was no evidence of work previously done in Nigeria to test the sero-prevalence of brucellosis in constantly migrating camel herds in the range. This study was designed to determining the sero-prevalence of brucellosis among nomadic migratory camel herds located in the Lake Chad Area of Borno state, North eastern Nigeria.

MATERIALS AND METHODS

Two hundred and fifty four (254) sera samples were collected from adult camels of both sexes in nomadic migratory herds located in the Lake Chad Area of Borno state, North eastern Nigeria between December, 2007 and February, 2008. Blood (5ml) was aseptically collected from jugular vein, using hypodermic syringe and needle; blood in the syringe was gently transferred into sterile plain bijou bottle, labelled and placed in a slanting position for one hour to get the serum separated from the clotted blood. Sera samples were stored at - 20°C. The sera was examined for *Brucella* antibody by RBPT as described by OIE manual (2004) and MSAT as described by Alton *et al.* (1988). Sera samples with titre greater than 1:40 (30IU) are considered positive according to WHO (2006).

RESULTS

Out of the 254 sera samples collected from adult camels of both sexes, comprising of 89 males and 165 females, in herds located in the Lake Chad area, 24 (9.4%) samples were positive by both RBPT and MSAT. Out of the positive samples, 10 (3.9%) and 14 (5.5%) males and females respectively were positive by both RBPT and MSAT (Table I). All samples tested positive to RBPT also tested positive to MSAT. There was no statistically significant association between sex of camels male with OR=1.324 (95% CI on OR=0.613-2.859); female with OR=0.970 (95% CI on OR=0.889-1.058) and serological reaction ($P>0.05$). The overall prevalence rate of brucellosis among camel herds in the Lake Chad area of Borno state was 9.4%.

Table I: Sex distribution of the serological test (RBPT/MSAT) status of the camels tested.

Sex	Total Animals tested	RBPT		MSAT		95% CI on OR		
		Positive	Negative	Positive	Negative	OR	Lower	Upper
Male	89	10(3.9%)	79	10(3.9%)	79	1.324	0.613	2.859
Female	165	14(5.5%)	151	14(5.5%)	151	0.970	0.889	1.058
Total	254	24(9.4%)	230	24(9.4%)	230			

DISCUSSION

Brucellosis among camel herds in the range has not been studied extensively in Nigeria. Most of the previous studies were carried out on camels slaughtered in various abattoirs. The prevalence of 9.4% found in this study is lower than the report by Waghela *et al.* (1978) in a serological survey of brucellosis in North Eastern Province of Kenya, where the prevalence of 14% was found among camels tested for infection. Bitter (1986) examined 948 camels from different herds in eastern Sudan and reported a prevalence of 16.5-32.3%. Musa (1995), who examined 416 camels from seven herds owned by nomads of the same clan in western Sudan, found 23.3% prevalence and concluded that camels ranked second only to cattle in the rate of infection with brucellosis. In another study in Sudan, Musa *et al.* (2008) reported a prevalence of 28.3% in camels. Junaidu *et al.* (2006) in a sero-prevalence study of brucellosis in camels slaughtered in Sokoto State abattoir of North-western Nigeria, found 37 (11.42%) samples positive to Rose Bengal Plate test (RBPT), serum agglutination test (SAT) and competitive enzyme linked immunosorbent assay (cELISA). Adamu, *et al.* (1997) carried out a sero-epidemiology of brucellosis in one-humped camel (*Camelus dromedarius*) in three northern states, reported prevalence rates of 12.5%, 18.6% and 25.5% in Kano, Kaduna and Borno States respectively. The higher prevalence reported could be due to differences in camel population sampled and location. Another reason could be that most camels, especially the females, presented for slaughter are culled as a result of productive or reproductive failure which could be *Brucella* infected. The prevalence of 9.4% in this study was higher as compared with the findings of Gameel *et al.* (1993) in Libya who reported that the prevalence of 4.1%, from sera of 967 camels of both sexes tested for antibodies to *Brucella* using the Rose Bengal

plate test (RBPT), serum agglutination test (SAT) and the complement fixation test (CFT). Our findings was also higher as compared with the 1% reported among slaughtered camels in Kano by Okoh (1979) and 7.5% by Kudi *et al.*, (1997) out of 480 camels sampled in the same area. The prevalence of 9.5% by Zaria *et al.* (1990) was similar to our finding but a lower prevalence of 1.8 per cent (Egbe-Nwiyi *et al.*, 1999) was reported in camels slaughtered in Maiduguri Borno state North-Eastern Nigeria. The variations in the prevalence could be due to difference in sample sources as those earlier studies were based on samples collected from camels slaughtered in various abattoirs, while our work was based on camel herds in the range. In this study there were more serologically positive reactors among the female camels than males, however not statistically significant, but this is in contrast with Agab (1993) and Yagoub *et al.* (1990) who reported that the seroprevalence of brucellosis was three to four-folds higher among adult camels than young ones and two-folds higher in females compared to males. This finding also disagrees with the findings of Zaria *et al.* (1990); Egbe-Nwiyi *et al.* (1999); Kudi *et al.*, (1997); Adamu, *et al.* (1997) and Junaidu *et al.* (2006) all of whom reported higher sero-prevalences of brucellosis among female camels than males.

In conclusion there should be officially coordinated control programme for brucellosis in livestock in Nigeria. More epidemiological investigations into brucellosis in camel herds in the range should be conducted to elucidate more risk factors associated with the disease.

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