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Prevalence of antibodies against *Brucella* organisms in one humped camel (*Camelus dromedarius*) slaughtered in the Maiduguri Municipal Abattoir

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ABSTRACT: Serological investigation of one-humped camels (*Camelus dromedarius*) was carried out to determine the status of brucellosis among camels slaughtered in the Maiduguri municipal abattoir of Borno state, North eastern Nigeria. A total of two hundred and fifty seven (257) sera samples collected from adult camels slaughtered in the abattoir and analysed by Rose Bengal Plate Test (RBPT) and Microtitre Serum Agglutination Test (MSAT). Thirty eight (14.8%) were positive by both RBPT and MSAT; out of which 13 (5.05%) males were positive and 25 (9.7%) females were positive by both RBPT and MSAT. There are more serologically positive female than male camels (OR =3.064; $p<0.05$) All samples tested positive to RBPT also tested positive to MSAT, except one (1) female that tested negative to RBPT gave positive test to MSAT. While one sample (female) that tested negative to MSAT gave positive to RBPT.

Key words: Sero-prevalence; Brucellosis; Camels; Abattoir; Borno; Nigeria.

Introduction

Brucellosis is an infectious and contagious bacterial zoonotic disease caused by *Brucella* spp in humans and various species of domesticated, feral (wild) animals and marine mammals (FAO, 2003). Camel is now an acceptable food animal providing meat, milk and milk products and also providing industrial raw material hides, wools and bones as by-products (Knoess, 1977; Ajogi, *et al*., .1995; Farah, 2004; Kazmi, 2006). 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). Camels can be infected by either of the main species of the genus *Brucella* (*B. abortus* and *B. melitensis*) (Abbas and Agab, 2002). The camel might have contracted the infection through close contact between infected and susceptible animals and cross transmission between species, through the alimentary tract from contaminated feed or water, through the respiratory system via contaminated dust or droplets, or through the genital system from infected semen (Bale, 1991).

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Camels are believed to be a reservoir for brucellosis (Abou-Eisha, 2000). The zoonotic potential of brucellosis in Nigeria is increased by the growing practise of eating undercooked meat and the fact that raw camel milk is increasingly regarded as a delicacy (Kudi *et al*., 1997). In Nigeria the initial report on prevalence of brucellosis among camels 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 same area by microtitre serum agglutination test (MSAT) by Kudi *et al*. (1997).

Adamu and Ajogi (1999) also reported the prevalence of 12.5% amng camels slaughtered in Kano. Junaidu *et al* (2006) in study of sero-prevalence of brucellosis in camel slaughtered in Sokoto State abattoir of North-western Nigeria found the prevalence of 11.42% 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 one-humped camel (*Camelus dromedarius*) brucellosis in three northern states have reported prevalence rate of 12.5%, 18.6% and 25.5% in Kano, Kaduna and Borno States respectively. Prevalence rate 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.

Materials and Methods

Two hundred and fifty seven (257) sera samples collected from adult camels of both sexes slaughtered in Maiduguri municipal abattoir of Borno state, North eastern Nigeria between. Blood (5ml) was aseptically collected from jugular vein before slaughter, 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^{o}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 greater than 30IU are considered positive as described by WHO (2006).

Results

Out of 257 samples 38(14.8%) tested positive by both RBPT and MSAT from which 13 (5.05%) were males while 25 (9.7%) were females. All samples tested positive to RBPT also tested positive to MSAT, except one (1) female sample among the samples that tested negative to RBPT gave positive test to MSAT. While one sample (female) from abattoir that tested negative to MSAT gave positive to RBPT. Overall prevalence of brucellosis among one-humped camels (*Camelus dromedarius*) in this study was 14.8%. There was statistically significant association between serological test positive and female sex with OR=3.064 (95% CI on OR= 1.514-6.202) at $p<0.05$ (Table 1).

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

		RBPT		MSAT			95% CI on OR	
Sex	Total Animal tested	Positive	Negative	Positive	Negative	OR	Lower	Upper
Male	144	13(5.05%)	131	13	131	0.784	0.328	1.872
Female	113	25(9.7%)	88	25	88	3.064	1.514	6.202
Total	**257**	**38(14.8%)**	**219**	**38**	**219**			

Discussion

Camels are believed to be a reservoir for brucellosis (Abou-Eisha, 2000). The zoonotic potential of brucellosis in Nigeria is increased by the growing practise of eating undercooked meat and the fact that raw camel milk is increasingly regarded as a delicacy (Kudi *et al*., 1997).The one-humped camel (*Camelus dromedarius*) may serve as a potential source of *Brucella* infection to other livestock and human in Nigeria (Ajogi and Adamu, 1998).

The prevalence of 14.8% found in this study was closely similar to the prevalence found 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 the disease. But our finding was lower than those reported by Bitter (1986) who 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. While Musa *et al* (2008) reported prevalence of 28.3% in camels in Sudan. Our finding was also lower than 25.5% found by Adamu, *et al* (1997) in studies on seroepidemiology of one-humped camel (*Camelus dromedarius*) brucellosis in camels slaughtered in Borno state. This higher prevalence could be due to difference in camel population sampled and location.

The variations in the prevalence could also be due to difference in sample population size in which we sampled only 257 camels. The other reason for the variations in the prevalence could also be due to difference in sample source in which our samples were obtained from camels slaughtered in abattoir unlike those that were sampled from herds in field. Our findings was higher as compared with 1% among slaughtered camels in Kano reported by Okoh (1979), Adamu, *et al.* (1997) also reported a lower prevalence of 12.5% in Kano state, Nigeria and Kudi *et al*., (1997) reported 7.5% out of 480 camels sampled in the same area. Junaidu *et al* (2006) in study of sero-prevalence of brucellosis in camel slaughtered in Sokoto State abattoir of North-western Nigeria found a lower prevalence of 11.4%. The difference in the prevalence could be due to variations in sensitivity and specificity of the different sero-diagnostic techniques employed, sample size and sampling period. A slightly similar sero-prevalence of 9.5% reported by Zaria *et al.* (1990), while 25.5% by Adamu, *et al*, (1997) was higher and a lower prevalence of 1.8% by Egbe-Nwiyi *et al.* (1999) were reported in camels slaughtered in Maiduguri Borno state North-Eastern Nigeria. In this study, there are more positive serological reactors among female (9.7%) than male (5.05%) camels.

These findings are in agreement with the works of Egbe-Nwiyi *et al*. (1999) who reported that out of 38 serologically positive camels 71.4% were females while 28.6% were males and Kudi *et al*. (1997) who reported prevalence of 7.5% among male and 8.3% among female camels. A relatively similar result was reported by Junaidu *et al*. (2006) 19 (10.10%) out of 188 females and 18 (12.78%) out of 141 male were serologically positive.

Conclusion

As camels are now assuming greater role of providing milk and meat to the populace in this area with potential public health significance, this underscores the role of camels in the epidemiology of brucellosis. This study revealed that 14.8% of the 257 slaughtered one-humped camels sampled in Maiduguri municipal abattoir were positive for brucellosis. In view of this there is need for officially coordinated public awareness on the presence of brucellosis among camels with emphasis on its economic impact and public health implications. Abattoir workers need to be enlightened on the mode of transmission and methods of prevention of this disease. There is a growing demand for and consumption of camel meat because camels are relatively cheaper than cattle. For this reason proper abattoir and meat hygiene is strongly recommended.

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