



Seroprevalence of Brucellosis In Horses In Ilorin Metropolis, Kwara State, Nigeria

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ABSTRACT

The study was conducted to determine the seroprevalence of brucellosis in horses in Ilorin Metropolis, Kwara State, Nigeria. A total of 48 sera samples were collected from horses in Ilorin Metropolis. Sera were analyzed using Modified Rose Bengal Plate Test (mRBPT). The overall seroprevalence determined was 16.67% with a higher seroprevalence (18.18%) in stallions, no seroprevalence rate was recorded in mares (0.00%). The highest seroprevalence (33.33%) was recorded in Ilorin South, followed by 12.90% in Ilorin West and the lowest (12.50%) was recorded in Ilorin East. The brucella antibodies circulating in the blood of the sampled horses in the study area is of public health importance and it was thus recommended that there is the need to educate grooms, horses handlers, stable workers, horses riders and the general public in the study area on the public health significance of the disease and to study the epidemiology of the disease with a view to avert the disease and to prevent zoonoses.

Key Words – Brucellosis, modified Rose Bengal Plate Test,

INTRODUCTION

Brucellosis is a worldwide bacterial zoonosis. It is recognized as a major cause of significant economic losses in livestock due to its primary effect on the reproductive system in affected animals with concomitant reduction in production, and it also poses a serious threat to human health [1, 2]. Reports on equine brucellosis are rare [3] despite the endemicity of this disease in Nigeria [4, 5]. The few reports on equine brucellosis have focused on clinical cases [3, 6] and to our knowledge only one serological study had been conducted in Nigeria until recently [7].

Brucellosis is commonly transmitted to susceptible animal by direct or indirect contacts [8]. Aborted fetus, placental membrane, vaginal discharge or other fluid present after an infected animal has aborted or given birth may be contaminated with *Brucella* organism. Other source of infection is through copulation, artificial insemination, uterine discharge, contact with fluids of an infected animal such as milk, blood, urine. Also, wild animals infected with brucellosis can transmit the disease to domestic livestock population [9, 10].

Brucellosis in horses is usually associated with infectious bursitis, arthritis or tenosynovitis. Less commonly, cases of vertebral osteomyelitis [11], abortion in mares and infertility in stallions have been recorded [12]. Fistulous withers and Poll evil are the commonest clinical manifestations in the horse, and infection most frequently involves *Brucella abortus* [13]. There is no apparent age, gender or breed predisposition to infection in horses, most cases have been reported in horses aged >3 years [14].

Fistulous Withers is a chronic inflammatory disease of the supraspinatus bursa and

associated tissues [15, 16]. Although infection by *B. abortus* has been associated with the condition [17, 18], other infectious organisms and trauma can also cause the disease. Horses with fistulous withers that are seropositive to *B. abortus* are significantly more likely than seronegative horses with fistulous withers to have radiographic evidence of osteomyelitis of the underlying dorsal spinous processes [16]. Poll evil (septic supra-atlantal bursitis) causes similar clinical signs to fistulous withers in the poll region. There is frequently pain and neck stiffness. Swelling of the region occurs which may be followed by discharge of purulent material [13]. Affected horses remain carriers for life [19]. The incubation period of brucellosis could be 2 weeks to 1 year or longer [20].

Horses had been reported to usually acquire *B. abortus* infection from cattle [12, 21]. In most instances, horses get infected as a result of mixed grazing with infected cattle. With the prevalence of bovine brucellosis in Kwara state reported to be high, based on Bovine *Brucella* Antibody Test (BBAT), 13.3% (n=16/120) cattle were positive for brucellosis and also based on RBPT, 14.2% (n=17/120) cattle were positive for brucellosis [20], there are tendencies that horses within the region are affected with brucellosis.

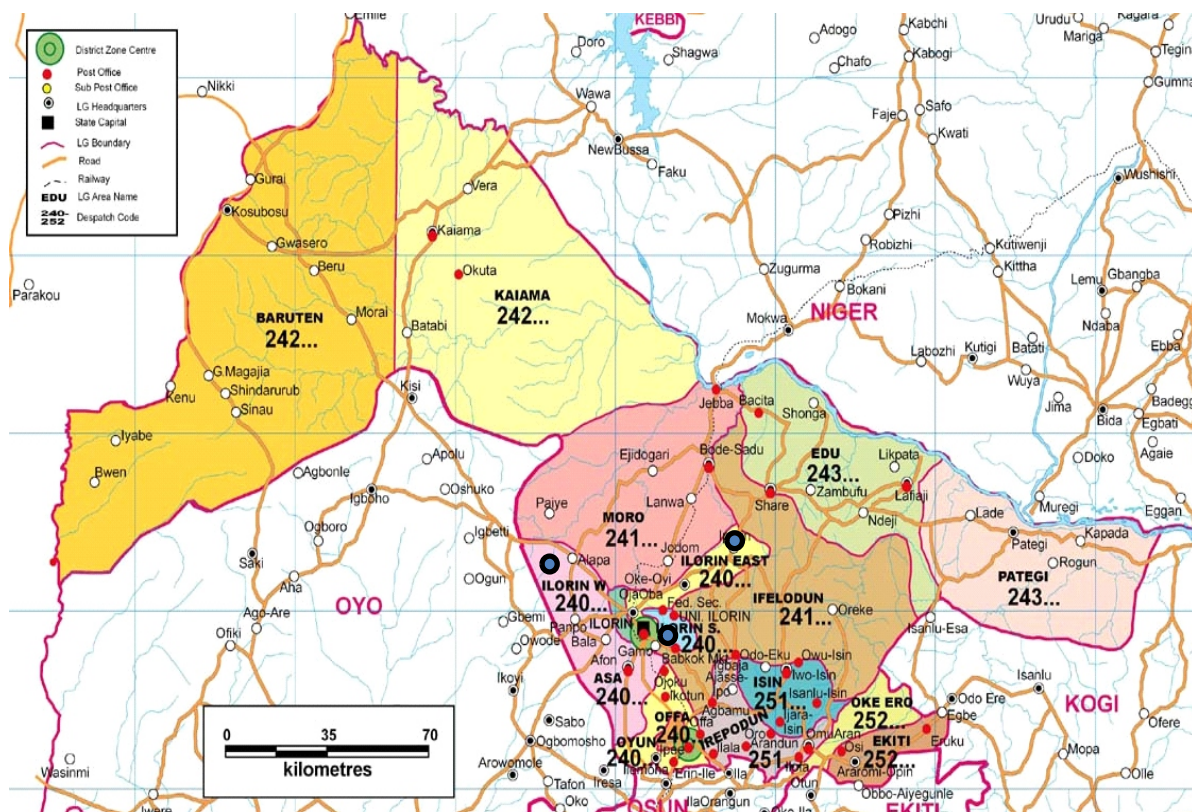
Horses infected by *B. abortus* may represent a source of infection to man [22, 23], although documented cases of this route of infection are rare [24]. Highly prone individuals are Groomers, Horses handlers, Veterinarians, Zoo keepers, Stable workers, Horses riders among others [25]. The need to determine the prevalence of the disease in horses in the study area and to use this knowledge in prevention of zoonoses led to this study.

MATERIALS AND METHOD

Study Area

The study was carried out in Ilorin metropolis, Kwara State, Nigeria. It is on the latitude 8° 30'N and longitude 4° 33'E. It is made up of three Local Government Areas, namely; Ilorin East, Ilorin South, and Ilorin West. The city is about 765 km² in area.

The city has a tropical climate. The average annual temperature is 26.5°C. Rainy season is between late March and early November and annual rainfall varies from 1000mm to 1500mm, with peak between September and early October, while the dry season starts from late November to early March.



LEGEND

Sample Location - ●

Figure 3: Map of Kwara State showing Ilorin city and other neighbouring towns.

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Sampling Sites

Purposive sampling was carried out for the study. Samples were collected from all stables in the three Local Government Areas in Ilorin. All horses available at the stables were sampled since the number of horses in Kwara State is minimal as compared to other northern states.

Study Animal

Horses sampled were all of Arewa breed which are the predominant breed kept in the study area. They were between the ages of 1-17 years old and they were used for ceremonial functions and tourism. The horses were mainly managed on semi-intensive management system.

Sample Collection and Handling

Approximately 8ml of blood was collected by jugular venipuncture, aseptically from each animal using disposable sterile needles and syringes. The blood was then decanted into 10ml plain sample bottles (without anticoagulant). The samples were labelled appropriately according to the Local Government Area and Animal number. The samples were then centrifuged at 3000 revolution per minute (rpm) for 5 minutes for separation between the blood cells and the serum. The sera were collected, labelled according to the corresponding labels on the plain sample bottles and stored in the freezer at -20°C until modified Rose Bengal Plate Test (mRBPT) was conducted as described by Bale (2008) and modified by Bertu *et al* (2012).

Laboratory Investigation of Sera Samples

Modified Rose Bengal Plate Test (mRBPT)

This is a modified form of the standard Rose Bengal Plate Test. The modified method was used because it increases the level of specificity of the test [26]. 3 drops of sera (approximately

75µl) was mixed with 1 drop of antigen (approximately 25µl). The plate was rocked for 4 minutes and the results of the test were recorded. The results were then presented in tables.

RESULTS

Distribution of Horses in Ilorin Metropolis, Kwara State, Nigeria

A total of 48 horses which were of Arewa breed were sampled from the study area. Of these, 31 (64.6%) were from Ilorin West, 8 (16.7%) were from Ilorin East and 9 (18.7) were from Ilorin South (Table 1).

Seroprevalence of *Brucella* antibodies in Horses in Ilorin Metropolis, Kwara State, Nigeria

Of the 48 horses sampled, 8 (16.67%) were seropositive for *Brucella* antibodies using the mRBPT. 4 (12.90%) of the 31 horses from Ilorin West were positive, 1 (12.50%) out of the 8 horses in Ilorin East was positive while 3 (33.33%) out of 9 horses were positive in Ilorin South (Table 2).

Table 1: Distribution of Horses sampled in Ilorin Metropolis, Kwara State, Nigeria

LGA	No Sampled (%)
Ilorin West	31 (64.58)
Ilorin East	8 (16.67)
Ilorin South	9 (18.75)
Total	48 (100)

Table2: Seroprevalence of *Brucella* antibodies in Horses in Ilorin Metropolis, Kwara State, Nigeria

LGA	Number of Samples tested	No positive by mRBPT (%)
Ilorin West	31	4 (12.90)
Ilorin East	8	1 (12.50)
Ilorin South	9	3 (33.33)
Total	48	8 (16.67)

Seroprevalence of *Brucella* antibodies by Sex and Age in Horses in Ilorin Metropolis, Kwara State, Nigeria

Out of the 48 horses sampled, 4 mares (8.33%) were examined and all tested negative as seen in table 4.3. Similarly, of the 44 males examined (91.67%), 8 (18.18%) were tested positive. The female horses (mares) were all from Ilorin West.

The seroprevalence of horses by age is presented in Table 4.4 below. Horses between 1 and 5 years had seroprevalence of 2.08% while those between 6 and 10 years had seroprevalence of 12.50%. Similarly, horses between 11 to 15 years old age bracket had seroprevalence of 2.08% while those between 16 to 20 years had 0.00% seroprevalence.

With regards to seroprevalence by LGAs, horses in Ilorin West between the age ranges of

1-5 years had seroprevalence of 0.00%, those between 6-10 years had seroprevalence of 30.00%, and those between the age brackets 11-15 had seroprevalence of 11.11% while those between 16-20 years had seroprevalence of 0.00%.

Horses in Ilorin East between the ranges of 1-5 years had a seroprevalence of 0.00%, those between the age bracket of 6-10 years had seroprevalence of 20.00%, while those between 11-15 years and 16-20 years had seroprevalence of 0.00%.

Horses in Ilorin South between the ranges of 1-5 years had seroprevalence of 100.00%, those between the age range of 6-10 years had seroprevalence of 40.00%, while those within the age bracket of 11-15 years and 16-20 years had seroprevalence of 0.00%.

Table 3: Seroprevalence of *Brucella* antibodies by Sex of Horses in Ilorin Metropolis, Kwara State, Nigeria

LGA	No Sampled	Sex		No positive mRBPT (%)
		Female	Male	
		No positive (%) mRBPT	No Sampled	
Ilorin West	4	0 (0.00)	27	4 (14.81)
Ilorin East	0	0 (0.00)	8	1 (12.50)
Ilorin South	0	0 (0.00)	9	3 (33.33)
Total	4	0 (0.00)	44	8 (18.18)

Table 4: Seroprevalence of *Brucella* antibodies by Age of Horses in Ilorin, Kwara State, Nigeria

AGE	LGAs					
	No Sampled	Ilorin West No positive (%) mRBPT	No Sampled	Ilorin East No positive (%) mRBPT	No Sampled	Ilorin South No positive (%) mRBPT
1-5 years	11	0 (0.00)	1	0 (0.00)	1	1 (100.00)
6-10 years	10	3 (30.00)	5	1 (20.00)	5	2 (40.00)
11-15 years	9	1 (11.11)	2	0 (0.00)	3	0 (0.00)
16-20 years	1	0 (0.00)	0	0 (0.00)	0	0 (0.00)
Total	31	4 (12.90)	8	1 (12.50)	9	3 (33.33)

DISCUSSION

Brucella abortus infection in horses is of great concern not only as a clinical condition but also as a potential source of infection for man and other animals [12].

In the investigation carried out, it could be seen that brucellosis in horses is still an endemic disease that needs proper attention. The seroprevalence obtained from the study (16.67%), corresponds with previous work in Plateau State but was higher than that in Kaduna State by the same author [27].

There is a significant prevalence in the male horses than in the female which corresponds with the result obtained in a study in Taraba State, Nigeria [28]. The low prevalence in the female horses could be due to the low number of female horses sampled in the study area. Stallions are more commonly kept for tourism and durbars than mares which are more commonly kept by breeders.

None of the horses that tested positive showed any apparent clinical signs. This was not surprising as it was reported that horses infected with *B. abortus* may remain asymptomatic; however they excrete the organism in milk, urine, and purulent discharges such as fistulous withers and poll evil [12].

The high seroprevalence recorded could be attributed to the fact that most of the horses sampled were observed to graze around areas known to be grazing areas for cattle, sheep and goats. Therefore, there is high probability that the horses may have been exposed to *B. abortus* through ingestion of contaminated pastures around or outside the stables especially when the high prevalence of brucellosis in cattle reported in the area [20] is considered. It has been reported that poor management practices and mix grazing with other species of livestock as a major cause for the spread of brucellosis [29]. Organisms have been able to survive in pasture for up to 144 days at 20°C and even in urine for up to 40 days [30].

The higher seropositivity as seen in 1 to 5 years old horses in this study could be as a result of the immune system of the younger animal not being as solid as that of adults and so would result in infections resulting faster following exposure to infective agents than adults. Another source of infection of young horses could be infections from dam via milk consumption from seropositive mares. We would have expected the younger horses to record lower seroprevalences since these horses were not sexually mature yet as to acquire the infection sexually through mating with other infected horses but this was not the case.

In conclusion it was determined that the seroprevalence of *Brucella* antibodies was on the increase and that the risks were higher with age and it was thus recommended that there is the need to educate stake holders as well as the general public in the study area on the public health significance of the disease along with the epidemiology of the disease and other diseases with a view to avert these diseases as well as to prevent zoonoses.

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