NSAP 47th Annual Conference (JOS 2022) CONFERENCE PROCEEDINGS
THEME: SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

DETECTION OF MYCOBACTERIUM BOVIS INFECTION IN DIFFERENT BREEDS OF CATTLE SELECTED FROM SETTLED AND SEMI-SETTLED HERDS IN KANO STATE, NIGERIA

Mohammed F.U.[1], Ibrahim S[2]Abubakar U.B[2].Danbirni S[2] Musa G.A[2]Kaltungo B.Y.[1] and Inuwa A.S.[3]
[1]Veterinary Teaching Hospital, Ahmadu Bello University, Zaria
[2]Department of Veterinary Medicine, Ahmadu Bello University, Zaria
[3] Veterinary Division, Ministry of Agriculture and Natural Resources, Kano
ijalingo1111@gmail.com

ABSTRACT

Tuberculin skin test was used to detect cattle infected with Mycobacterium bovis in 250 apparently healthy cattle of different ages, and breeds from eight herds, under Settled and Semi settled management system. Out of the 250 cattle tested, 183 were from settled herds and 67 from semi settled. The results showed a prevalence of 8.2% in the settled herds with no positive reactors in the semi settled herds. Cattle older than 6 years had a prevalence of 9.0% (8) this was followed by age group 3.5-6years 4.5% (3)and 1- 3.5years (4.2%) respectively. Prevalence based on breeds showed Bunaji0.0% (0) Sokoto Gudali3.5% (2), Crosses 12.0% (8) and Friesian 35.7% (5). In conclusion M. bovis infection was detected in the settled herds with no positive reactors in the semi settled. It is hereby recommended that routine testing of settled and semi settled herds should beregularly carriedoutinorder to identify positive reactors and also recommend necessary treatment and control measures.

Key words: Cattle, *M. bovis*, Management practice, Breed,Single caudal fold tuberculin test

INTRODUCTION

Tuberculosis (TB) is an infectious, granulomatous disease caused by acid fast bacilli of the genus *Mycobacterium.* Tuberculosis continues to be an important disease both in humans and animals, with high morbidity, mortality and economic loss worldwide (Thoen*et al.,* 2009). It is the most important zoonosis associated with enormous economic losses in the animal industries and severe hazards to human health worldwide, particularly in developing world (Ayele*et al.,* 2004).*Mycobacterium bovis (M. bovis*)is the specific cause of TB in cattle (Radostits*et al.,* 2000), and exposure to this organism causes a progressive debilitating chronic disease that jeopardizes animal welfare and productivity and leads to significant economic losses (Qureshi *et al.,* 1996).The existence of natural reservoir hosts and asymptomatic carriers contribute to the persistence of this disease inan environment (Radostits*et al.,* 2000).Routine screening of cattle for*Mycobacterium bovis* infection in Kano State and Nigeria has not been adequate (Ibrahim *etal*., 2010). Thus, there is the need to carry out routine testing in herds inorder to identify potential reactors and also suggest some ways of control and prevention.

MATERIALS AND METHODS

The study was carried out in Kano State which lies between latitude 11° 30' 0 N and longitude 8° 30' 0E. Herd selection was done based on owners' interest and consent and cattle older than 6 month of age and above were selected using systematic random sampling technique. A total of 250 cattle were sampled from Five (5) settled herd (organized herd) comprising of 183 cattle and three3 semi settled herd comprising of 67 cattle.Cattle selected where restrained as described by Alhaji (1976). Age, breed and management system were determined and recorded. Two hundred and fifty (250) cattle were subjected to single caudal fold intradermal test (SCF) as described by Monaghan *et al.* (1994), where 0.1 ml (3000 I.U) of purified protein derivative of *M. bovis*(PPD bovis) obtained from Institute for Animal Science and Health Lolystcid, The Netherlands was injected using tuberculin syringe with 26G X$^{3}/_{8}$inc needle into the deeper layers of the skin (dermis) of the caudal fold approximately 5cm distal to the base of the tail. The injection site was visually observed and palpated after 72 hours following injection of PPD.

Positive reactions were indicated by either diffuse or nodular swelling, firm and warm at the point of injection. Where there was no detectable swelling by visual examination and palpation at the injection site is considered

negative. An animal was considered suspect when reaction was detectable only by palpation and no or slight swelling at the injection site.

Statistical Analysis: The data obtained was entered into minitab statistical software. Analysis was done using descriptive statistics to determine the prevalence based on age, breed and management system

RESULTS

Of the 183 cattle tested in settled herds, 8.2% (15) were positive while no positive reactor was recorded among the 67 cattle tested in the semi settled herds. The results of the 250 cattle tested showed 95 were between the age group of 1-3.5 years, 66 were of 3.5 -6 years and 89 were above 6 years, of which 4(4.2%), 3(4.5%) and 8(9%) were found to be positive reactors respectively. Prevalence based on breeds indicated 108 were Bunaji, 63 Sokoto Gudali, 65 Crosses of (Friesian/ Sokoto Gudali and Friesian/Bunaji) and 14 exotic breed (Friesian breed), with 0 (0%), 2(3.5°), 8(12.3%) and 5(35.7%) number of positive reactors recorded respectively among the breeds (Table 1)

Table 1: Prevalence of *M.bovis* infection in the study herds based on Management system, Age and Breed

Variable	Number tested	Number positive	Prevalence
Management system			
Settled herd	183	15	8.2
Semi settled herd	67	0	0
Age			
1-3.5 years	95	4	4.2
3.5-6 years	66	3	4.5
> 6years	89	8	9
Breed			
Bunaji	108	0	0
Sokoto Gudali	63	2	3.5
Cross	65	8	12
Frisian	14	5	35.7

DISCUSSION

The tuberculin skin test result obtained in this study showed 8.2% positive reactors to M. bovis using Purified Protein Derivatives (PPD). This finding is higher than the 1.08 % reported by Ibrahim *et a l*(2010) in neighboring Jigawa State and also higher than what was reported by Alhaji (1976) in some herds in Kano State. This indicates that the disease is on the increase thus there is the need to strengthen the national policy for control and eradication of the disease through routine testing and improvement on biosecurity practices. Higher prevalence rate of *M. bovis* infection was recorded in settled herds than in semi settled herds. Settled herd management system promotes close contact between animals favoring the spread of *M. bovis* (Shehu, 1988). Inhalation of *M. bovis* is considered the main route by which animal to animal transmission occurs, animals in settled herd which share common feeding and watering troughs and contaminated stagnant drinking water can cause infection up to 18 days (Ayele*et al.,* 2004). However, semi settled management system with no housing raises the question as to how transmission of infection can easily occur. Housing predisposes to the disease, as does zero grazing, so that the disease is more common and serious where these forms of husbandry are practiced. The closer the animals are in contact the greater is the chance that the disease will be transmitted (Radostits *et al.,* 2000). The study also showed the effect of age on the prevalence of M. bovis infection as reflected by the tuberculin test. The proportion of positive reactors increased with ages which indicate an increased incidence of bovine TB with increase age and is in agreement with Abubakar (2007), Shehu (1988) and Munroe (2000). Furthermore, the results showed Bunaji were free of M bovis infection, the difference in prevalence between Bunaji, Sokoto gudali, Cross (Friesian/Bunaji) and Friesian/Sokoto gudali) and exotic (Fi'iesian) breeds was significant and is in agreement with Alhaji, 1976 and Radostits*et al.,* 2000 but disagreed with Salisu, 2007. Historical reports

indicated that Bos taurus (Exotic) are more susceptible to bovine TB than Bos indicus (Local) (Radostits*et al.,* 2000). Similar result was reported that genetically improved cattle might suffer more severely from malnutrition and poor housing systems in tropical countries and consequently become more susceptible to infection (Kiros, 1998).

CONCLUSIONS

In conclusion *M. bovis* infection was detected in the settled herds with no positive reactors in the semi settled. The findings also showed that the disease is on the increase as compared to what was obtained in previous studies.

RECOMMENDATIONS

It is hereby recommended that all positive reactors should be isolated and treated, routine herd testing against *M. bovis* infection should be carried out regularly.

REFERENCES

Abubakar, I. A. (2007). Molecular epidemiology of human and bovine tuberculosis in Federal Capital territory and Kaduna State, Nigeria, *PhD. Thesis,* Plymouth University., U.K.

Alhaji, I. (1976). Bovine tuberculosis in four northern states of Nigeria. *PhD. Thesis,* Ahmadu Bello University, Zaria, Nigeria. 236

Ayele, W.Y., Neil.S. D., Zinsstag, J. Weiss, M. G. and Pavlik, I. (2004). Bovine Tuberculosis: An old disease but new threat to Africa: *Review article. Intern ational Journal of Tuberculosis and Lung Disease,* 8(8): 924-937.

Ibrahim S, Agada CA, Umoh JU, Ajogi I, Farouk UM, Cadmus SI (2010). Prevalence of bovine tuberculosis in Jigawa State, northwestern Nigeria. Tropical animal health and production. 42(7):1333-5.

Kiros, T. (1S98). Epidermiology and Zoonotic importance of bovine tuberculosis in selected sites of Eastern Shoa. Ethiopia, MSc Thesis. Addis Ababa, University and free University of Berlin

.Monaghan, M. L.. Doherty, M. L., Collins, J. D., Kazda, J. F. and Quinn, P. J. (1994). The tuberculin test Veterinary Microbiology, 40 111-124.

Qureshi, T, Tsmpleton, J. and Adams, L. G. 91996). Intracellular survival of Brucella abortus, Mycobacterium bovisBCG, Salmonella dublin, Salmonella typhimurium in ma;rophages from cattle genetically resistant to Bmcellar abortus. Veterinary Immunology and Immunopathology. 50:55-65.

Radostits, O.M and Blood, D.C., (2000). Diseases caused by bacteria. A textbook of diseases of cattle, sheep, pig, goat and horse. 9th Ed. Book Power, pp. 909-933.

Salisu, I (2007). The Epidemiology of Human and Bovine Tuberculosis in Jigawa State. MSc. Thesis, Ahmadu Bello University, Zaria, Nigeria.

Shehu, L.M (988). Survey of tuberculosis and tubercule bacilli in Fulani herds."None" and some herdsmen in Zaria, Nigeria. MSc Thesis. Ahmadu Bello University, Zaria, Nigeria

Shirima, G.M., Kazwala, R.R., and Kambarage, D.M (2002). Prevalence of Bovine
tuberculosis in cattle in different farming systems in Eastern Zone of Tanzania *Preventive Veterinary Medicine,* 57(3): 167-172.