



Sero-prevalence of Contagious Bovine Pleuropneumonia (CBPP) in Khartoum State, Sudan

Omer Saboun Hassan^{1*} and Hyafa Mohammed Ismail²

¹Department of Preventive Medicine and Veterinary Public Health

²Faculty of Veterinary Medicine, University of Khartoum, Sudan

ABSTRACT

This study was conducted to determine the sero-prevalence of Contagious Bovine Pleuropneumonia (CBPP) and its related risk factors in Khartoum state, Sudan. A total of 200 cattle sera were collected from different farms in Khartoum state in Bahari and Omdurman, and tested for the presence of *Mycoplasma mycoides* subsp *mycoides* small colonies antibody using competitive Enzyme-Linked Immunosorbant Assay (cELISA). Of the total 200 cattle sera examined, 26 (13 %) were found positive for CBPP. Location, seasons, and age were not found statistically significant ($P > 0.05$) with regard to the occurrence of the disease. While, sex and breed were found statistically significantly ($P < 0.05$). In conclusion, high sero-prevalence of Contagious Bovine Pleuropneumonia (CBPP) was found in Khartoum state. Hence, vaccination is very important for control of the disease.

Keywords : Contagious Bovine Pleuropneumonia (CBPP), Sero-prevalence, Khartoum state, Sudan

INTRODUCTION

Cattle considered as one of the most important farm animals for meat and milk production in Khartoum state. But it infected by different microbes which can lead to decreasing in its production. *Mycoplasma sp.* *Mycoplasma* causes more than one disease in bovine like pneumonia, mastitis, otitis, conjunctivitis, arthritis and tenosynovitis. *M. bovis* infection can cause economical losses due to treatment, laboratory diagnosis and cattle production (Fu *et al.*, 2014). *Mycoplasma mycoides* subspecies *mycoides* small colony (*MmmSC*), considered as main causative agent of Contagious Bovine Pleuropneumonia (CBPP). It is now one of the most important transboundary disease, along with Foot and Mouth Disease (FMD). CBPP is a highly infectious acute, sub acute and chronic disease of cattle and occasionally water buffalos (*Bubalus bubalis*) caused by *Mycoplasma mycoides* subsp. *mycoides* Small Colony (*Mmm SC*); it is one of the diseases recognized by OIE that needs to be controlled or eradicated through a national surveillance protocol (OIE, 2014). This study was conducted to:

- i) Investigate the sero-prevalence of Contagious Bovine Pleuropneumonia (CBPP) in Khartoum state, Sudan.

- ii) Identify the risks factors associated with the Contagious Bovine Pleuropneumonia (CBPP).

MATERIAL AND METHODS

Study area

The study was carried out in Khartoum state, namely in Bahari and Omdurman. It is situated between longitudes 31 32 E, and latitude 15 36 N.

Samples collection

Serum samples were collected from Bahari and Omdurman locality. A total of 200 serum samples were collected in different seasons to detect the antibody of *Mycoplasma mycoides subsp mycoides*.

Study animals

Herds of cattle managed under the traditional extensive production system were included in this study

Competitive Enzyme Linked Immune Sorbent Assay (cELISA)

The test was developed by the OIE Collaborating Center for the diagnosis and control of animal diseases in tropical countries (Le Goff & Thiaucourt, 1998)

Latex examination

The test was carried out according to the manufacturer's procedure for BoviLAT test Kit (BoviLAT PA6223). To perform the test, the sera was brought out from the freezer and allowed to attained ambient temperature. Twenty micro litre of serum was dropped onto a black reaction card using plastic dropper. This was carefully dispensed to avoid air bubbles. The BoviLAT Latex reagent was well shaken and a drop of the reagent was added close to the spot where the serum was dropped. The BoviLAT Latex reagent and the serum were mixed together using mixture system for a few minutes and the mixture spread out inside the reaction cell. The reaction card was rocked from left to right for three minutes and any agglutination or otherwise was recorded. A maximum of six reactions were done at a time.

Data analysis

Statistical analysis was done using SPSS version 20. Descriptive statistic such as frequency and percent was used for variables. Person chi-square was used for association between variables and Contagious Bovine Pleuropneumonia (CBPP).

RESULT AND DISCUSSION

Thirteen percent (n=26 animals) of the samples tested by the c-ELISA test from Bahari and Omdurman showed positive reactions and eighty seven percent (n=174animals) showed negative reactions. The same results were obtained for Latex agglutination test and there was no significant difference observed for the two tests (P=0.207). (The result is shown in table 1 and 2).

Table (1): The prevalence rate of Contagious Bovine Pleuropneumonia CBPP using c-Elisa test in Khartoum State.

Site	No. Examined	No of	Prevalence	Chi-square	df	P-value
------	--------------	-------	------------	------------	----	---------

		Positive	Rate%			
Bahari	100	16	8%	1.592	1	0.207
Omdurman	100	10	5%			
Total	200	26	13%			

Table (2): The prevalence rate of Contagious Bovine Pleuropneumonia CBPP using latex agglutination test in Khartoum State.

Site	No. examined	Positive	Prevalence rate%	Chi-square	df	P.value
Bahari	100	16	8%	1.592	1	0.207
Omdurman	100	10	5%			
Total	200	26	13%			

Association between sex and presence of CBPP

The prevalence rate in females was 10.5% (n= 21) and in males was 2.5% (n= 5). Statistically there was no significant difference observed (P=0.020). (The result summarized is in table3).

Table (3): Association between sex and presence of CBPP

Sex		Site		Total	Chi-square	df	P-value
		Bahari	Omdurman				
Male	Positive	1(0.5%)	4(2%)	5 (2.5%)	5.4	1	0.02
	negative	10(5%)	65(32.5%)	75 (37.5)			
Female	Positive	15(7.5%)	6(3%)	21 (10.5)			
	negative	74(37%)	25(12.5%)	99 (49.5)			
Total		100(50%)	100(50%)	200 (100%)			

Association between breed and presence of CBPP

The prevalence rate in cross-breed was13% (n=26), while local breed (Baggara, and Kenana) gave a prevalence rate of 0.0%. A statistical significant difference was observed. (p=0.008). (The result is shown in table 4).

Table (4): Association between breed and presence of CBPP

Breed	Result		Chi-square	df	P.value
	Positive	negative			
Cross breed	Positive	26(13%)	7.01	1	0.008
	negative	136(68%)			
Local breed	Positive	0(0%)			
	negative	38(19%)			
Total		200(100%)			

Association between Season and presence of CBPP

The prevalence rate in dry season was 3% (n=6) was. While, , 10 % (n= 20) of the prevalence rate

recorded in rainy season. There was no significant difference observed $p=0.549$. (The result is summarized in table 5).

Table (5): Association between season and presence of CBPP

Season	Result		Chi-square	df	P-value
Dry season	Positive	6(3%)	0.359	1	0.549
	negative	50(25%)			
Rainy season	Positive	20(10%)			
	negative	124(62%)			
Total	200(100%)				

Association between age and presence of CBPP

The prevalence rate in age group (0-3) years was 3.5 %(n=7), in age group (3-6) years was 7%,(n=14) and in age group 6> years was 2.5 (n=5)%. Statistically there was no significant difference $P=0.26$. (The result is shown in table 6).

Table (6): Association between age and presence of CBPP

Age	Result		Chi-square	df	P.value
0-3years	Positive	7(3.5%)	2.5	2	0.26
	negative	70(35%)			
3-6years	Positive	14(7%)			
	negative	86(43%)			
> 6 years	Positive	5(2.5%)			
	negative	18(9%)			
Total	200 (100%)				

Discussion

Contagious Bovine Pleuropneumonia (CBPP), infectious and highly contagious diseases of cattle in Africa, is the only bacterial disease in the OIE list a diseases. This severe respiratory disease of cattle is the second most important transboundary animal disease in Africa after rinderpest. The control of the disease is very difficult, because the movement of animals from different places to others and late diagnosis of some animals which are seem healthy. Also the treated animals became carriers by formation of sequestra. So, that may lead to very high economical losses by decreasing the production of milk, meat and death from the contagious bovine pleuropneumonia.

The present study was carried out in Khartoum state. A total of 200 serum samples were tested by using competitive enzyme linked immunosorbant assay (c-Elisa) test and 13% (26 animals) were positive to test. The results confirm the persistence of Contagious Bovine Pleuropneumonia in different areas of Khartoum state. The prevalence rate in this study is higher than prevalence rate of study carried out in Maiduguri abattoir, North eastern Nigeria by Jasini *et al.* (2015) and study of Mainda *et al.*; (2016) in Dello Mena and Sawena Districts of Bale Zone, South Eastern Ethiopia. This variation due to production system, sample size, epidemiology of the disease and the vaccination status can play important role.

In North east States of Peninsular Malaysia, the prevalence rate was 8% from 3242 serum samples carried by (Zarina.M *et al*; 2016). Less than rate of Khartoum state, because the endemicity in the Sudan by *mycoplasma mycoides subsp mycoides* small colony and large number of cattle. Similarly, Amira in 2009 in Khartoum state stated the persistence of Contagious Bovine Pleuropneumonia, by using competitive enzyme linked immunosorbent assay. In conclusion, high sero-prevalence of Contagious Bovine Pleuropneumonia (CBPP) was found in Khartoum state. Hence, vaccination is very important for control of the disease.

REFERENCES

- [1] Amira.S. (2009). Contagious bovine pleuropneumonia isolation and seroprevalence in khartoum state, sudan. thesis to master degree,University of Khartoum.
- [2] Fu, ZH.; Sun, ZQ.; Yu,YW.; Zhang,JJ.; and Shen.(2014). Enzyme linked immunosorbent assay based on a competition format for sensitive detection of antibodies to *Mycoplasma bovis* in serum. *Anal chem.* **2014**;86(3): 1701-1709.
- [3] Jasini,A.Musa.; Livinus,T.Ikpa.; Fati,A.Lawan.; Enenche,F.Ejeh.; and Quagar,J.Tizhe.(2015). Detection of antibodies to *Mycoplasma mycoides* subspecies *mycoides* in cattle using competitive enzyme-linked immunosorbent assay. *International journal of current microbiology and applied science.* **2015**;8(4):770-777.
- [4] pleuropneumonia. *Biomedicine and nursing.* 3(1):1-18.
- [5] Mainda, A.G.; Kemal,K.; Dagim,B.; and Aynalem,T. (2016). Sero-epidemiological investigation and risk factors for contagious bovine pleuropneumonia infection of cattle in Dello mena and Sawena districts of bale zone, south eastern Ethiopia. *Journal of public health and epidemiology.* **2016**;9(5):122-132.
- [6] Office International des Epizootics (OIE) (2014). Contagious bovine pleuropneumonia in manuals of standards for diagnostic tests and vaccines. Office international des epizootics. Paris, France.
- [7] Zarina,M.; Zamri,S,M.; Latiffah,H.; Shahrom.M,S. and Norlida.O.(2016). Seroprevalence and detection of contagious bovine pleuropneumonia in northeast states of Peninsular Malaysia. *Pertanika j. Trop.Agric.* **2016**;39(2):257–265.