P-ISSN: 2304-3075; E-ISSN: 2305-4360
International Journal of Veterinary Science
www.ijvets.com; editor@ijvets.com

Short Communication

Bovine Tuberculosis: A 3-Year Retrospective Study on Incidence and Economic Implication of Gross Pathologic Condemnations at Karu Abattoir, Abuja, Nigeria

Akinbobola JS[1], Akinbobola RIA[2], Omeje JN[3], Tijani KA[1], Hamidu ZA[4] and Okaiyeto SO[5]

[1]Veterinary Teaching Hospital, University of Abuja, Abuja, Nigeria; [2]Department of Veterinary Microbiology and Parasitology, Faculty of Veterinary Medicine, University of Ibadan, Nigeria; [3]Department of Veterinary Medicine, Faculty of Veterinary Medicine, University of Abuja, Nigeria; [4]Ministry of Agriculture and Rural Development, Federal Capital Territory Administration, Abuja, Nigeria; [5]Veterinary Teaching Hospital, Ahmadu Bello University, Zaria, Nigeria
***Corresponding author:** jonesakinbobola@gmail.com

Article History: Received: April 14, 2017 Revised: May 05, 2017 Accepted: May 14, 2017

ABSTRACT

Meat from Karu abattoir serves a large proportion of Abuja Municipal Area Council residents in the Federal Capital Territory (Abuja) and some parts of Nasarawa state. For this reason, the study was conducted to investigate the prevalence and direct economic losses associated with tuberculosis in cattle slaughtered in Karu Abattoir, Federal Capital Territory, Abuja. Using abattoir records and average cost of organ per kilogram from 2013-2015, prevalence of bovine tuberculosis and associated economic losses were statistically evaluated. There was an overall prevalence of 0.72%. Prevalence in males was 0.61% (95% Confidence Interval: 0.61±0.06) while it was 0.93% (95% Confidence Interval: 0.93±0.01) in females. An annual prevalence of 0.73% (95% Confidence Interval: 0.73±0.08), 0.69% (95% Confidence Interval: 0.69±0.09) and 0.76% (95% Confidence Interval: 0.76±0.01) were recorded in 2013, 2014 and 2015 respectively. Seasonal prevalence also revealed a higher organ condemnation in the rainy than dry season.
The total economic loss resulting from post mortem condemnations was valued at N1,639,000 ($9526.7). Annual economic losses for 2013, 2014 and 2015 were valued at N513,200 ($3237.2), N505,100 ($3055.3) and 620,700 ($3234.2) respectively. In addition to the economic losses accruing from condemnation, it was concluded that the residents of the area council are exposed to the zoonotic disease.

Key words: Bovine tuberculosis, Economic implication, Incidence, Karu abattoir

INTRODUCTION

Bovine Tuberculosis (BTB) is a chronic bacterial disease in cattle, which is characterized by respiratory signs and granulomatous lesions affecting thoracic and abdominal organs (Ejeh *et al.*, 2014). The disease is widespread, zoonotic, poorly controlled and with serious threat to public health in Africa (Awah-Ndukum *et al.*, 2010), leading to low productivity, mortality and loss of huge sum of money from carcass condemnation at slaughter (Cadmus *et al.*, 2009). The identification of characteristic tuberculosis lesions is the routine diagnostic test at the abattoir (Aliyu *et al.*, 2009). Although meat inspection is prone to inspector subjectivities and errors (Awah-Ndukum *et al.*, 2012), it provides excellent opportunities to ascertain the extent to which the public is exposed to certain zoonotic diseases, and is useful in estimating the financial implications of carcass condemnation to butchers (Asaaava *et al.*,2009, Awah- Ndukum *et al.*, 2012). Studies on the prevalence of this disease in Nigeria have reported 12.27% in Gombe (Aliyu *et al.*, 2009), 0.01% in Zango abattoir-Zaria (Alawa *et al* 2010), 0.61% in some parts of western Nigeria (Cadmus *et al.*, 2008), 0.46% in Zambia (Phiri 2006), 1.90% in Makurdi (Ejeh *et al.*, 2014), 15.08% in Nassarawa state (Yohanna *et al.*, 2008), 4.47% in Oyo state (Jenkins *et al.*, 2011) and 0.54% in Ogbomoso (Ameen *et al.*, 2008).

The economic losses associated with BTB have been reported by Cadmus & Adesokan, 2009 in western Nigeria and Ejeh *et al.*, 2014 in Makurdi, which were valued at N41,613,043 and N2,910,000 respectively.

On BTB, there is dearth of information from Karu abattoir, and this slaughter-house provides wholesome meat to two states (Nasarawa and Federal Capital Territory) in Nigeria. Therefore, there is a need to assess the current status and economic implication of this important zoonotic disease.

Cite This Article as: Akinbobola J, R Akinbobola, J Omeje, K Tijani, Z Hamidu and S Okaiyeto, 2017. Bovine tuberculosis: a 3-year retrospective study on incidence and economic implication of gross pathologic condemnations at Karu Abattoir, Abuja, Nigeria. Inter J Vet Sci, 6(2): 118-120. www.ijvets.com

MATERIALS AND METHODS

Study location

The study was conducted at Karu abattoir, which is located in Federal Capital Territory, Abuja. The abattoir is controlled by the Federal Capital Territory Administration, Abuja. Its geographic coordinates are 9^0 0' 39" North and 7^0 34'31" East (Balogun, 2001).

Data collection

Data for the study was obtained from abattoir records between 2013 and 2015 while the average fixed cost per kilogram and cost by mere oral bargaining of edible organ were obtained by oral interview with the butchers.

Abattoir records between 2013 and 2015 were used for the study. The fixed cost per kilogram of edible organs and cost of organ sold by mere bargaining (intestine and spleen) were obtained by oral interview with the butchers.

Data analysis

The annual, seasonal and overall prevalence of BTB were calculated as total number of BTB cases divided by the total number of cattle slaughtered. Financial losses were determined from Direct Economic Losses (DEL); which equals (number x Weight of condemned organ) x Average Price/Kilogram. The obtained results were subjected to student T and Analysis of Variance Test for establishment of significance using SPSS statistical package version 16.0 (IBM- Nigeria 2012).

RESULTS

A total of 106,628 cattle were slaughtered and 772 organs were condemned during the study period. The result reveals that the prevalence rate was higher in females (0.93%) than males (0.61%) (Table 1).

The overall prevalence was 0.72% while an annual prevalence of 0.73%, 0.69% and 0.76% were recorded in 2013, 2014 and 2015, respectively (Table 2). Seasonal prevalence also revealed a post-mortem detection rate of 0.96% and 0.49% in the wet and dry season, respectively (Table 3). The study also revealed that lungs and intestines were the major and least organs affected by the tuberculosis lesions, respectively. The total number and quantity of all organs / offal condemned amounted to 772 and 1070 kg respectively, and the total economic loss was valued at N1,639,000 ($9526.7). The annual economic losses recorded in 2013, 2014 and 2015 are N513,200 ($3237.2), N505,100 ($3055.3) and N620,700 ($3234.2), respectively (Table 4).

DISCUSSION

The prevalence of BTB was found to be higher in female than male. This could be because female cattle stay longer in the herd than male cattle for breeding purpose, thus making them more exposed to *Mycobacterium* spp. (Nwata *et al*., 2011). This is similar to the report of Ejeh *et al*. 2014, in Yola (Nigeria), who reported a strong association between sex and tuberculosis lesion. The overall prevalence of BTB was 0.72%. This is at variance with the reports of Ameen *et al.*, 2008 (Ogbomoso), Danbirni *et al.*, 2012 (Taraba), Ejeh *et al.*, 2014 (Makurdi), who reported an overall prevalence of 0.54%, 2.8% and 1.90%, respectively. This relatively lower prevalence could be attributed to a thorough meat inspection at Karu abattoir. There was a fluctuation in the prevalence of BTB along the three years of study. It could be due to differing subjectivity in capacity or lack of thoroughness of veterinary staff carrying out meat inspection. This is similar to the result of Awah Ndukum *et al.*, (2010), who reported fluctuation in prevalence along a five year study (2008–2012) while it disagrees with the report of Opara (2005), who observed a steady decrease along 1999–2002. The detection rate of BTB is similar in both rainy and dry season. This agreed with the results of Awah–Ndukum *et al*. (2010), who reported that

Table 1: Sex prevalence of the cattle with BTB

Sex	Cattle examined	Diseased cattle	Prevalence % (95% Confidence Interval)
Male	69061	421	0.61(0.61±0.06)
Female	37567	351	0.93 (0.93±0.01)

Table 2: Annual prevalence of tuberculosis lesions in cattle slaughtered in Karu Abattoir from 2013 to 2015

Year	Number of slaughtered cattle	Number of BTB lesions	Prevalence % (95% Confidence Interval)
2013	41058	298	0.73% (0.73±0.08)
2014	34266	236	0.69% (0.69±0.09)
2015	31304	238	0.76% (0.76±0.01)
TOTAL	106628	772	0.72% (0.72±0.05)

Table 3: Seasonal prevalence of BTB lesions in slaughtered cattle

Season	Slaughtered cattle	BTB lesions	Prevalence % (95% Confidence Interval)
Wet (March-August)	52124	499 (64.6%)	0.96 (0.96±0.08)
Dry (September-February)	54504	273 (35.4%)	0.49 (0.49±0.06)

Table 4: Direct economic losses from condemnation of edible organs

Organs	2013			2014			2015		
	Condemnation (n) (%)	Total Condemned Weight (Kg)	DEL (N)	Condemnation (n) (%)	Total Condemned Weight (Kg)	DEL (N)	Condemnation (n) (%)	Total Condemned weight (Kg)	DEL (N)
Lungs	235 (78.9%)	240	384000	152 (64.4%)	155	263500	138 (58.0%)	141	253800
Liver	15 (5.03%)	45	72000	28 (11.9%)	112	190400	41 (17.2%)	164	295200
Heart	44 (14.8%)	66	46200	56 (23.7%)	64	51200	53 (22.3%)	58	52200
Intestine	4 (1.34%)	10	11000	0 (0%)	0	0	6 (2.5%)	15	19500
	298 (100%)	361	513200	236 (100%)	331	505100	238 (100%)	378	620700

DEL= nKg X Av.P/Kg; 1$ = N153.53 (2013); 1$ = N165.32 (2014); 1$ = N191.92 (2015); DEL- direct economic loss, Av.P- Average price, Kg-Kilogram, N- Naira, $- Dollar.

BTB detection was not influenced by season but by the level of exposure to stress. The lungs accounted for the majority of edible organs condemned. This is because the mycobacterium organism is an aerobic organism and the lung tissues have rich oxygen supply (Raja, 2004). This agrees with the work of Ejeh *et al.*, 2014, in Makurdi (Nigeria) who reported that the lung was the major edible organ condemned in cases of tuberculosis. During the period of study, 772 (1070kg) organs were condemned and this amounted to N1,639,000 ($9,526.7) This is at variance with Ejeh *et al.*, 2014, who reported condemnation of 1935 (3046.50 kg) edible organs which led to economic loss valued at N2,910,000 ($18,200) in Makurdi (Nigeria) and Cadmus and Adesokan (2009), who reported 124333 kg organ condemnation at 12 abattoirs with an economic loss of N41,613,043 ($332,904). This economic loss to butchers, which is without compensation, has led to the aggressive behavior towards meat inspectors at abattoirs in Nigeria. These condemned organs are excellent sources of minerals, vitamins and amino acids to individuals suffering from some health challenges.

Conclusion

A concerted effort must be on deck to control BTB in cattle because of the risks associated with it in humans. Compensation to butchers for condemned body parts and or organs should be reintroduced, as this will encourage butchers to join hands with the government and veterinarians to eradicate BTB.

REFERENCES

Aliyu MM, YJ Adamu and YA Bilyaminu, 2009. Current prevalence of tuberculosis lesions among slaughtered cattle in north eastern States of Nigeria. Revue d'Elevage et de Medecine Veterinaire des Pays Tropicaux, 62: 13-16.

Ameen SA, OS Adedeji, AK Raheem, OO Leigh, TA Rafiu and OA Ige, 2008. Current status of bovine tuberculosis in ogbomoso area of Oyo State, Middle-East. J Sci Res, 3: 207-210.

Asaaava LL, PM Kitala, PB Gathura, MO Nanyingi, G Muchemi and E Schelleng, 2009. A survey of bovine/human taeniosis in Northern Turkana District, Kenya. Prev Vet Med, 89: 197-204.

Awah-Ndukum J, AC Kudi, G Bradley, IN Ane-Anyangwe, S Fon-Tebug and J Tchoumboue, 2010. Prevalence of bovine tuberculosis in abattoirs of the littoral and western highland regions of Cameroon: A cause for public health concern. Vet Med Inter, Article ID 495015, http://dx.doi.org/10.4061/2010/495015.

Awah-Ndukum J, AC Kudi and G Bradley, 2012. Prevalence of Bovine tuberculosis in cattle in the highlands of Cameroon based on the detection of lesions in slaughtered cattle and tuberculin skin tests of live cattle. Vet Med 57: 59–76.

Balogun O, 2001. The Federal Capital Territory: Geography of its development. Ibadan University Press, Nigeria.

Cadmus SIB, HK Adesokan and AEJ Awosanya, 2008. Public health issues and observations made during meat inspection at Bodija Municipal Abattoir, Ibadan, Oyo state, Nigeria. Niger Vet J, 29: 43–47.

Cadmus SIB and HK Adesokan, 2009. Causes and implications of bovine organs/offal condemnations in some abattoirs in Western Nigeria. Trop Anim Health Prod 41:1455-1463.

Cadmus SIB, HK Adesokan, AO Jenkins and D Van Soolingen, 2009. *Mycobacterium bovis* and *Mycobacterium tuberculosis* in Goats, Nigeria. Emer Infec Dis, 15: 2066-2067.

Danbirni S, SO Okaiyeto, IA Joshua, KB Sackey, KC Anthony and IA Abdulkadir, 2012. Prevalence of Tuberculosis in a Herd of Cattle of a Tuberculous herdsman following trace back Information from a Hospital in Taraba State, Nigeria. J Anim Prod Adv, 2: 325-328.

Damina MS, OA Owoludun, S Chukwukere, JA Ameh and MM Aliyu, 2011. The use of deletion analysis in the detection of *Mycobacterium bovis, Mycobacterium tuberculosis* and *Mycobacterium africanum* among slaughtered cattle in Plateau State, North Central Nigeria. Niger Vet J, 32: 9-15.

Ejeh EF, MA Raji, M Bello, FA Lawan, MI Francis, AC Kudi and SIB Cadmus, 2014. Prevalence and direct economic losses from bovine tuberculosis in Makurdi, Nigeria. Vet Med Inter, Article ID 904861, http://dx.doi.org/10.1155/2014/904861

Jenkins AO, SIB Cadmus and EH Venter, 2011. Molecular epidemiology of human and animal tuberculosis in Ibadan, Southwestern Nigeria. Vet Microbiol, 151: 139-147.

Nwata JA, CN Umeononigwe, GE Abonyi and JI Onunkwo, 2011. Retrospective study of bovine and human tuberculosis in abattoirs and hospitals in Enugu State, Southeast Nigeria. J Public Health Epidemiol, 3: 329-336.

Opara MN, 2005. Pathological conditions from abattoirs in Akwa Ibom state, Nigeria. Anim Res Inter, 2: 314-318.

Phiri AM, 2006. Common conditions leading to cattle carcass and offal condemnations at 3 abattoirs in the Western Province of Zambia and their zoonotic implications to consumers. J South Africa Vet Assoc, 77: 28-32.

Yohanna CA, IF Ijabone and SIB Cadmus, 2008. Prevalence of bovine tuberculosis using single comparative intradermal tubeculin test (SCITT) in Fulani herds in Nasarawa state, north central Nigeria. Sokoto J Vet Sci, 7: 49-51.

Raja A, 2004. Immunology of tuberculosis. Indian J Med Res, 120: 213-232.