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RETROSPECTIVE STUDY ON BOVINE TUBERCULOSIS AND OTHER DISEASES OF PUBLIC HEALTH IMPORTANCE AT OKO-OBA ABATTOIR, LAGOS STATE

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Abstract

Meat inspection in abattoirs plays a fundamental role in identifying zoonotic diseases in animals slaughtered for human consumption. This study was carried out to review the current status of tuberculosis and other diseases of public health importance in slaughtered cattle at Oko-Oba Abattoir, Lagos State over a period of four years (2004-2007). A total of 1, 154, 757 cattle were slaughtered from which 22, 073 (1.91%) had pathological lesions; with 4, 734 (0.41%) and 17, 339 (1.50%) being due to tuberculosis and other diseases of public health importance respectively. The overall infection rate varied significantly with seasons of the year ($P < 0.05$, $X^2 = 25.76$). Similarly, the 1.50% for the non-tuberculosis diseases comprising fascioliasis (0.67%), myiasis (0.42%), dermatophilosis (0.30%) and cysticercosis (0.11%) differs significantly from the 0.41% recorded for tuberculosis ($P < 0.05$), therefore showing more losses attributed to these other diseases. Our findings show that approximately two out of every 100 cattle slaughtered at this abattoir pose potential health risks to the consumers in the state. Hence, the Government and other stakeholders in the livestock industry need to join efforts at controlling and possibly eradicating these diseases from the cattle population.

Introduction

Animal and human health are inextricably interwoven and food animals, especially cattle serve as a reservoir of diseases of public health importance. Over the years, several reports have been made on the incidence (Babalola and Van Veen, 1976) and prevalence rates (Antia and Alonge, 1981; Nwosu, 1987) of these diseases in Nigeria, some of which have far-reaching effects on man including tuberculosis (TB), fascioliasis, dermatophilosis, myiasis and cysticercosis.

Cases of bovine tuberculosis both in herds and abattoirs in Nigeria have been reported previously (Ayanwale, 1984; Dusai and Abdullahi, 1994; Cadmus *et al.*, 1999 and 2003). *Mycobacterium bovis* and *M. tuberculosis* have been reported to cause severe disease in cattle and man respectively (Seifert, 1996; OIE, 2004).

Apart from bovine tuberculosis, fascioliasis caused by *Fasciola gigantica* is another disease

of public health importance common in cattle. In a survey carried out by Babalola and Van Veen (1976) in Bauchi abattoir, an overall incidence rate of 31.7% was obtained. In the same vein, Onunkwo *et al.* (2003) reported a prevalence of 3.18% at Nsukka abattoir, Nigeria while between 2.63% – 3.2% were reported by Ansari-Lari and Moazzeni (2006) in Iran. Though there have been reports of human infections in some other countries; epidemiological data are lacking in Nigeria (Ibironke, 2010). These infections usually occur as a result of accidental ingestion of water or raw aquatic vegetables contaminated with the metacercaria. Esteban *et al.* (2002) recorded 24.3% mean prevalence among school children in Peru while Marcos *et al.* (2005) obtained 33.3% and 51.9% by faecal examinations and serology respectively in the same region.

Dermatophilosis also remains a notable skin condition found in cattle in Nigeria. It is an acute, subacute or chronic skin disease affecting a wide range of species of animals and man. It is distributed worldwide, but more prevalent in the humid, tropics and subtropics. Though there is dearth of information on the cases of human infection, its public health importance should not be underestimated.

Myiasis refers to the invasion into living tissues of humans and other mammals by the eggs or larvae of flies from the Order Diptera (Kersten *et al.,* 1986; Baliga *et al.,* 2001) and cases of human infection have been reported in various parts of the world including Nigeria (Chung *et al.,* 1996; Ihsan *et al.,* 2003; Adisa and Mbanaso, 2004; Hira *et al.,* 2004; Hemmings *et al.,* 2007).

Furthermore, another common finding in slaughtered cattle is cysticercosis which is an important zoonotic endoparasitic disease caused by *Cysticercus bovis*, the larval stage of *Taenia saginata*. Its spread especially in Africa and other developing nations has been associated with prevailing 'human habits' including poor sanitation and intimate association with animals (Sarti *et al.,* 1992; Macpherson, 1994). Although taeniasis is a non-fatal infection, it causes human illness, thus reducing productivity due to loss of man-hour.

Currently, approximately 36% of the Nigerian meat supply comes from beef alone as reiterated by Nwakpu and Osakwe (2007); and about 60% of the cattle population in Western Nigeria are slaughtered in Lagos State (Cadmus and Adesokan, 2009). As a result of the zoonotic implications of diseases originating from slaughtered cattle coupled with Lagos State being the second most populous in the country (NPC, 2006), there is a need to determine the possible health hazards posed to the public through beef consumption. This paper therefore reviews a four year record of tuberculosis and other diseases of public health importance in cattle slaughtered in Oko-Oba Abattoir, the main abattoir in Lagos State.

Materials and Method

Study site

Lagos State is the most populous state in Western Nigeria (NPC, 2006) and caters for about 60% of cattle slaughtered in this region (Cadmus and Adesokan, 2009). Oko-Oba Abattoir situated in Agege, Lagos State is the biggest and the main abattoir where a higher level of meat inspection is carried out and hence, gives a picture of the status of diseases in slaughtered cattle in the state.

Data collection and analysis

Records of animals slaughtered and diseases observed at post mortem during

meat inspections by veterinary officers in the abattoir were reviewed over a period of four years (2004-2007), although data for January to July 2004 and January, May, July and December 2006 were not available for analysis. Post mortem findings were based on evidence of suspected characteristic tuberculous lesions of organs as earlier described (Gracey and Collins, 1992; Seifert, 1996) and diagnosis made by veterinarians. The data were analyzed to show the frequencies of cattle slaughtered and prevalences of diseases encountered across the study period. Other diseases of public health importance apart from TB were designated as 'others' (Table 1).

Statistical analysis

Data were analyzed using the Chi-square test to test for levels of significance of tuberculosis and other diseases of public health importance in slaughtered animals during the study years.

Results

Over the study period, a total of 1, 154, 757 cattle were slaughtered from which 22, 073 (1.91%) had gross lesions. Out of these, 4, 734 (0.41%) and 17, 339 (1.50%) were attributable to TB and other diseases of public health importance respectively (Table 1). The non-tuberculosis diseases included fascioliasis (0.67%), myiasis (0.42%), dermatophilosis (0.30%) and cysticercosis (0.11%) (Table 2). Monthly case findings and yearly prevalence rates are as presented in Figures 1 and 2 respectively.

Table 1: Yearly prevalence rates of bovine tuberculosis (BTB) and other diseases of public health importance in cattle slaughtered in Oko-Oba Abattoir, Lagos State (2004-2007)

Year	No slaughtered	BTB	Others	Total with gross lesions	BTB (%)	Others (%)	% with gross lesions
2004*	156953	1098	1845	2943	0.70	1.18	1.88
2005	381825	1578	5509	7087	0.41	1.44	1.85
2006**	263056	960	4476	5436	0.37	1.70	2.07
2007	352923	1098	5509	6607	0.31	1.56	1.87
Total	1,154,757	4,734	17,339	22,073	0.41	1.50	1.91

* Data for January to July not included
** Data for January, May, July and December not included

Table 2: Prevalences of diseases recorded in cattle slaughtered in Oko-Oba Abattoir, Lagos State (2004-2007)

No of cattle slaughtered	Diseases	No infected	Percentage infected
1, 154, 757	Tuberculosis	4, 734	0.41
	Fascioliasis	7722	0.67
	Myiasis	4831	0.42
	Dermatophilosis	3489	0.30
	Cysticercosis	1297	0.11
	Total	22, 073	1.91

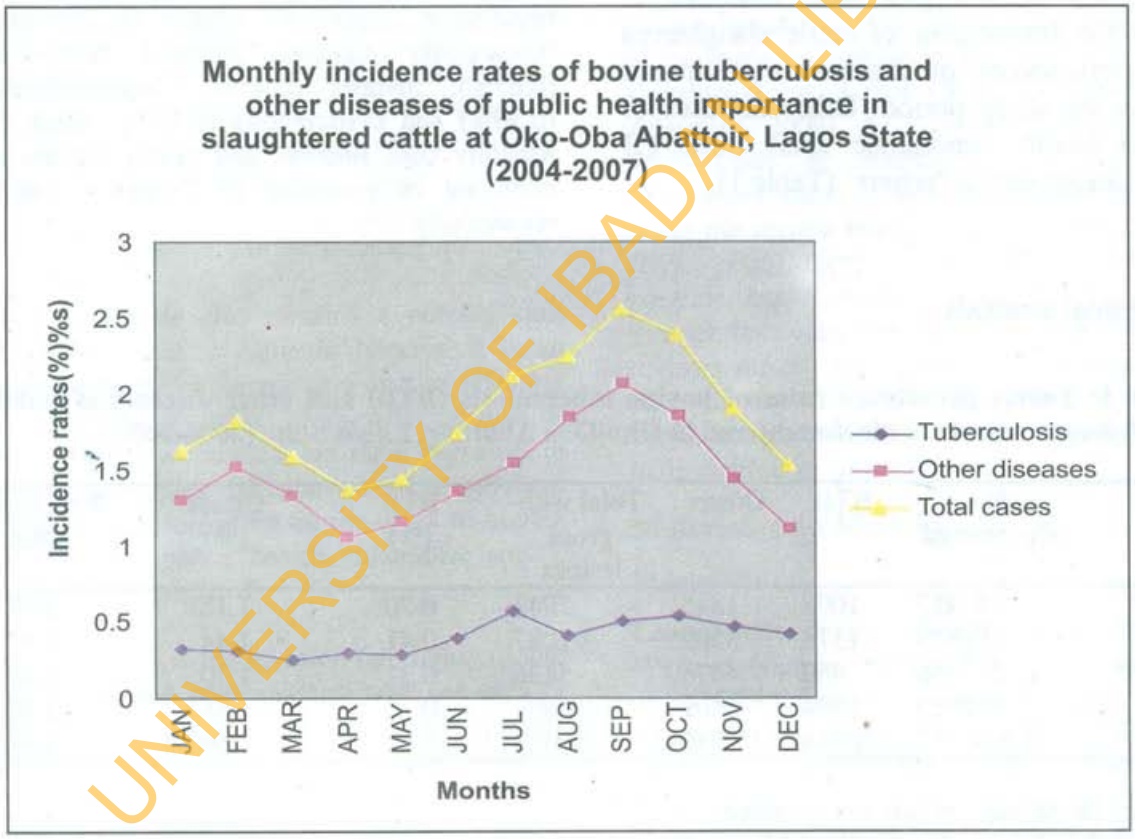

Figure 1

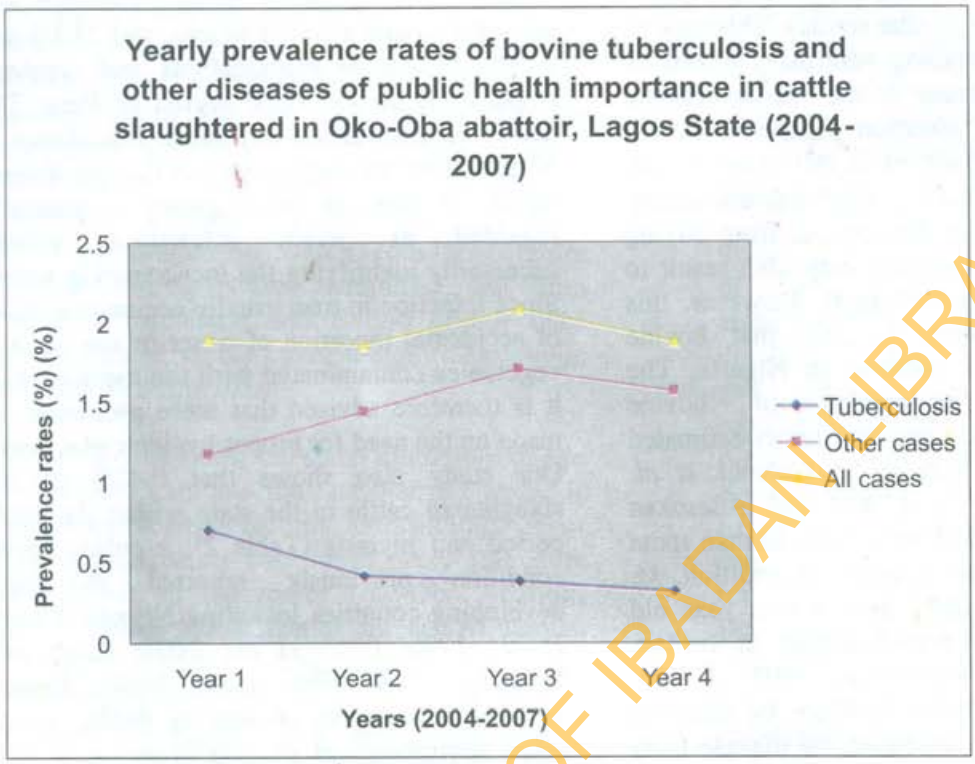

Figure 2

Discussion

The overall prevalence rate of 1.91% obtained in this study (Table 1) is higher when compared with the 0.83% recorded for diseases of public health importance in slaughtered cattle at SODEPA Abattoir, Cameroon by Awah-Ndukum *et al.* (2007). Since some of the cattle slaughtered in Nigerian abattoirs come from Cameroon and other West African countries where bovine tuberculosis is endemic (Muller *et al.*, 2009); differences observed might be due to the fact that the study in Lagos was based on abattoir records while that in SODEPA involved an active inspection of slaughtered animals. In addition, the overall infection rate varied with seasons of the year as it was significantly higher during wet ($P < 0.05$, $X^2 = 25.76$) than in the dry season (Figure 1). The plausible reason may be that risk factors (such as tick infestation and presence of snail vectors) for most of these diseases are associated with rainfall and humidity (Sprent, 1964; Okon and Enyenihi, 1977).

A cursory look at the prevalence rates of bovine tuberculosis reveals a decreasing trend across the years (Table 1, Figure 2). The 0.41% prevalence rate was not associated with seasons ($P > 0.05$, $X^2 = 1.46$; Figure 1). The rate recorded in Lagos is lower than 0.49% in Sokoto (Dusai *et al.*, 1994), 6.7% in Ibadan (Cadmus, 2003), 0.82% in Cameroon (Awah-

Ndukum *et al.*, 2007) and 3.1% in Ho, Ghana (Ankugah, 2002) in similar studies. This may be as a result of increasing veterinary efforts in controlling the disease at the various critical control points; an assertion justifiable by the decreasing trend observed in this state. It may also be due to increasing enlightenment among the butchers who are discouraged from buying diseased animals since this may also result to economic losses on their parts. However, this study also buttresses the fact that bovine tuberculosis is still endemic in Nigeria. The public health implications of bovine tuberculosis should not be under-estimated judging from the findings of Cadmus *et al.* (2006), Mawak *et al.* (2006) and Adesokan (2008) who isolated *M. bovis* from human sputa in some parts of the country. In addition, *M. bovis* was also isolated from a two year old child with cervical lymphadenitis in Ibadan, Western Nigeria (Cadmus *et al.*, 2005). A more proactive measure must therefore be taken to control and possibly eradicate the disease from the cattle population in Nigeria.

On the other hand, other diseases of public health importance accounted for 1.50% of the prevalence rate recorded in this abattoir; and it varies with seasons of the year showing significance for wet season ($P < 0.05$, $X^2 = 25.73$; Figure 1), with fascioliasis having the highest prevalence of 0.67% (Table 2). Other reports within and outside the country also indicated the presence of *Fasciola gigantica* infection in slaughtered cattle (Onunkwo *et al.*, 2003; Ansari-Lari and Moazzeni, 2006). In the past 20 years, there has been an upsurge globally in the incidence and morbidity of human disease particularly in developing countries especially in regions with intensive sheep or cattle production (Tolan and Fennelly, 2002). This is evidenced by the studies carried out by Esteban *et al.* (2002) and Marcos *et al.* (2005) in which 24.3% mean prevalence was recorded among school children; and 33.3% and 51.9% by faecal examinations and serology respectively in the same region of Peru. The dearth of information on human fascioliasis in Nigeria does not negate the fact that the disease exists, as most of its diagnosis is generally regarded as worm infestation without necessarily identifying the incriminating worm. Since infection in man usually occurs as a result of accidental ingestion of water or raw aquatic vegetables contaminated with the metacercaria, it is therefore advised that more awareness be made on the need for proper hygienic practices. Our study also shows that 0.42% of the slaughtered cattle in the state within the study period had myiasis (Table 2); a public health condition previously reported in some developing countries including Nigeria (Chung *et al.*, 1996; Ihsan *et al.*, 2003; Adisa and Mbanaso, 2004; Hira *et al.*, 2004). Human myiasis remains an increasing public health issue (Hemmings *et al.*, 2007) and it is thus recommended, that this zoonosis be given a more dynamic approach in both awareness and control strategies. Furthermore, an infection rate of 0.30% was recorded for dermatophilosis in this study (Table 2). As opined by Woldemeskel and Taye (2002), associated risk factors for this disease would include relatively high average annual rainfall and humidity, tick infestation, livestock management and production system. Pathogen, host and environmental factors must therefore be considered in order to understand the pathogenesis and hence, the possible control of dermatophilosis.

The 0.11% prevalence rate of cysticercosis in this study is lower than 26.2% earlier reported in southern Nigeria (Opara *et al.*, 2006); 2.7% in Zambia (Phiri, 2006), 5.98% in Cameroon (Awah-Ndukum *et al.*, 2007) and 26.25% in Ethiopia (Abunna *et al.*, 2008). This may be due

to mild infection of cysticerci in the carcasses which can easily be missed during inspection (Geerts *et al.,* 1980; Dorny *et al.,* 1997). The public health risk of cysticercosis for the consumer is clearly reduced in Nigeria since beef is usually well cooked before consumption. However, in cases of barbecue and 'suya'; a food preparation in which core temperature during cooking is not guaranteed, and from which Mosimabale and Belino (1980) once demonstrated viable cysts, a significant public health risk might exist.

Although this study had some limitations due to incomplete data and the fact that this report is based on abattoir records, our findings show that approximately two out of every 100 cattle slaughtered at the major Oko-Oba Abattoir, Lagos State are potential threats to human health. This is worrisome given the volume of cattle being slaughtered and the proportion of humans that consume beef and its products in the state. Therefore, more veterinary efforts should be directed at active meat inspection and enforcement of standards towards discouraging indiscriminate slaugh-tering of moribund and sick animals. Finally, the Government and all other stakeholders in the livestock industry are encouraged to put into machinery positive efforts at controlling bovine tuberculosis and other diseases threatening livestock production which are equally of public health importance.

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