Original Article

Food Safety

Seroprevalence of Trichinellosis in Pigs slaughtered in Bodija Abbattoir Oyo State Nigeria

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ABSTRACT [ENGLISH/ANGLAIS]

This survey was carried out to determine the prevalence of trichinellosis in Bodija municipal abattoir of Oyo state, Nigeria. Sera samples were collected from pigs slaughtered on the slabs from July to November, 2010 and taken to the laboratory in the department of Veterinary Microbiology and Parasitology, University of Ibadan for analysis. The samples were processed for *Trichinella* antibodies by ELISA using excretory-secretory (E/S) antigen.246 samples were collected and a prevalence of 15.04% was recorded. Adult pigs had a higher prevalence (35.55%) than the young (8.40, 14.29) and prevalence in male pigs was slightly higher (19.80%) than the females (11.72%) though this prevalence is not statistically significant.

Keywords: Seroprevalence, Trichinella, ELISA, sex, age, Nigeria

RÉSUMÉ [FRANÇAIS/FRENCH]

Cette enquête a été réalisée afin de déterminer la prévalence de la trichinellose chez Bodija municipal abattoir de l'État d'Oyo, au Nigeria. Échantillons de sérum ont été prélevés sur les porcs abattus sur les dalles de Juillet à Novembre, 2010 et apportés au laboratoire dans le département de Microbiologie et parasitologie vétérinaire, Université d'Ibadan pour l'analyse. Les échantillons ont été traités par Trichinella par ELISA en utilisant d'excrétion-sécrétion (E / S) antigen.246 échantillons ont été prélevés et une prévalence de 15,04% a été enregistrée. Porcs adultes ont une prévalence plus élevée (35,55%) que les jeunes (8,40, 14.29) et la prévalence chez les porcs mâles était légèrement plus élevé (19,80%) que les femmes (11,72%), bien que cette prévalence n'est pas statistiquement significative.

Mots-clés: La séroprévalence, Trichinella, ELISA, le sexe, l'âge, le Nigeria

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Accepted/Accepté: September, 2012

Full Citation: Adediran O, Uwalaka E. Seroprevalence of Trichinellosis in Pigs slaughtered in Bodija Abbattoir Oyo State Nigeria. World Journal of Life Science and Medical Research 2012;2(5):166-9.

INTRODUCTION

Trichinellosis, a zoonotic disease caused by nematodes belonging to the genus *Trichinella*, and family *Trichinidae*, occurs worldwide and is found in virtually all warm blooded carnivores and omnivores, including humans [1,2] Trichinellosis, though dating back to antiquity was only clearly evident in 1860 by Friedrick Zenker who showed the transmission from animal to man [3].

T.spiralis, considered to be the most pathogenic species is distributed worldwide and highly infective in pigs, mice and rats [4] The frequency of *Trichinella* outbreaks in human and animals in the world has led to the conclusion that it is an emerging or re-emerging disease in some parts of the world [5]

Reports from CDC [6] and Pozio [7] show that the condition has been seen in the United States and some parts of Africa. In Oyo state, Akinboade et al [8] carried out a study of trichinellosis in pigs using the pepsin digestion technique and obtained an incidence of 5.21%.

Anon [9] reported that more pork is consumed than other meat in the world and in 1998, pork represented 30% of world total meat consumption compared to 26.5% for beef and 28% for poultry [10].

Studies on trichinellosis in both human and animal in some countries of the world like Nigeria is limited and this has led to lack of reliable epidemiological information.

The objective of this study was to investigate the seroprevalence of trichinellosis in pigs

Slaughtered in bodija abattoir of Oyo State, Nigeria using Enzyme Linked Immunosorbent Assay (ELISA) technique

MATERIALS AND METHODS

The study location is the slaughter slab for pigs at Bodija abattoir located at Ibadan. Bodija abattoir is a major

abattoir located in Ibadan north local government area of Ibadan, Oyo state, Nigeria.The pigs that are slaughtered at this slab come from different parts of the state. The slaughtering capacity in the abattoir is between 10-15 pigs / day.The study was carried out from June to November 2010. Pigs of different species were slaughtered and samples were collected randomly. Blood samples were collected and sera obtained for Trichinella investigation. Demographic factors like age and sex were recorded. The blood was collected from the jugular vein at slaughter and serum was separated from the clot. .Sera samples were stored frozen.. The ELISA test was carried out in the laboratory using a kit from Prionics Lelystad B. V.Netherlands

The ELISA using *T.spiralis* E / S antigen was conducted according to standard procedures. Plates were read at 450nm.

The results were calculated as indicated in the manufacturer's protocol

$$\frac{\text{OD 450nm sample}}{\text{OD 450nm positive control}} \times 100 = X\ \%\ \text{Positivity}$$

Statistical analysis of the influence of age and sex was carried out using 1-way ANOVA and Student's T-test.

RESULTS

An overall prevalence rate of 15.04% (i.e. 37 were positive samples) was obtained from the 246 samples collected from the slaughter slab at Bodija abattoir.

Table 1: This table shows prevalence of Trichinellosis in pigs of different ages

Age group	Number of serum samples	Number of positive serum Samples	Prevalence Rate (%)
Adult	45	16	35.55
Growers	131	11	8.40
Weaners	70	10	14.29

Table 2: This table shows prevalence of Trichinellosis in pigs of different ages

Sex	Number of serum samples	Number of positive serum Samples	Prevalence Rate (%)
Male	101	20	19.80
Female	145	17	11.72

The percentage positivity per animal ranged from15.03% to 70.89%. Two samples (5.41%) of the positive samples had very high titres with percentage positivity of 70.89%and 41.16%. Trichinella positive samples had an ELISA index (%) ≥15 while the Trichinella negative samples had an ELISA index (%) < 15.

Adults pigs had a higher number of positives (16) and the highest prevalence rate of 35.55 % compared to growers (11, 8.40%) and weaners (10, 14.29%) (Table 1).

The male pigs slaughtered had a higher prevalence (19.80%) than females (11.72%) (Table 2).

DISCUSSION

The study is probably the first to investigate the seroprevalece of trichinellosis in Oyo state using ELISA technique. In 1984, Akinboade et al [8]reported a trichinellosis prevalence of 5.21% in Oyo state using pepsin digestion technique. The use of ELISA for antibody detection in various animals in the detection of trichinellosis has recorded various degrees of success [14-16]. The overall prevalence rate of 15.04% recorded in Oyo state was similar to that reported by Wang and Cui [13] in China but was at variance to reports by(10:15;18,19,20) Akinboade et al [8], Larrieu et al [11], Cha´vez-Larrea et al [14], La Rosa et al [15], Gamble [16]. Wang and Cui [13] reported a seroprevalence varying from 0.09% to 29.63%.

Larrieu et al [11] in Argentina reported a higher prevalence of 19.9%. Cha´vez-Larrea [14] reported 5.72% prevalence in Ecuador. La Rosa et al [15] reported 2.5% prevalence in Mexico while Gamble [16] reported a 0.013% seroprevalence in North America.

The difference in the result of this study compared with that of Akinboade et al [8] could be as a result of the different techniques employed. The pepsin digestion

technique has a limitation of being unable to detect all larvae present in the carcass while ELISA can detect serum antibody titre up to 130 weeks [17] .This high specificity could have led to the high prevalence since both current and old infections can be detected. The high percentage positivity indicative of high antibody titre could be from current infections while the lower decreasing titre could be as a result of waning immunity.

Adults were seen to be infected than growers or weaners. This is in line with the report of Akinboade et al [8] and Larrieu et al [11]. Adult pigs have a tendency to scavenge more than the growing ones and thus are more likely to be exposed to predisposing factors. The difference in prevalence rates between the age groups (adult, growers, weaners) however was not statistically significant, thus, age has no effect on prevalence.

The prevalence in males was found to be higher than in females. This corroborates the findings of Akinboade et al [8] and Larrieu et al [11]although the difference in prevalence rates was not statistically significant. The higher number of positive males could be as a result of their inquisitive nature that may have exposed them to more sources of infection.

CONCLUSION

This study concludes that trichinellosis is present in pigs in Ibadan Nigeria and the prevalence is higher than was previously reported.

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ACKNOWLEDGEMENT / SOURCE(S) OF SUPPORT

We acknowledge John D and Katherine MacArthur Foundation, and University of Ibadan, for partly sponsoring this work.

CONFLICT OF INTEREST

No conflict of interest was declared by authors.