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Prevalence and Risk Factors of Cestodes species in Cattle in White Nile State Sudan

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ABSTRACT

A cross sectional study was conducted during July to September 2015, to estimate the prevalence of cestode species in bovine in El--dwaem slaughterhouse in White Nile State. A total of 184 cattle were examined randomly during anti-mortem and the risk factors (origin of the animals, sex, breed, age, body condition, the treatment and grazing type) postmortem examination and flotation and sedimentation methods were used. The overall prevalence of cestode species was 57.6% in the meat of the cattle and 69.6% in feces. Univariate analysis was performed using chi-square as test of significance (significant level $p< 0.5$) for association between cestodes spices in cattle and potential risk factors. Cattle in poor conditions (p-value 0.001) and grazing in open areas (p-value 0.019) were showed significant association to the cestode species. A logistic regression was performed to the results of the univariate analysis using odds ratio and chi-square testes and these showed poor condition and grazing type were major risk factors causing the disease. in conclusion the presence of cestode worms in cattle was high in White Nile State which leading to leading to economic losses. Surveillance of potential parasites is crucial for sustenance of public health.

INTRODUCTION

Cestodiasis is one of the most prevalent hlemintic disease through the world causes a great health problem in many countries.(waleed *et al*., 2013). Three broad morphological forms of echinococcesis are recognized clinically cyctic echinococcesis caused by *E.granulosus,* alvelere

echinococcesis cause by *E.multilocularis* polycystic echinococcesis caused by *Echinococcus vogelior* , *E.oligoarthus* . Human cystic echinococcesis caused by *E.multilocularis*. In taenasis there is mild to moderate eosinophilia. Accounts for more than 95% of the estimate 2-3 million global cases, with human alveolar echinococcesis causing around 0.3- 0.5 million cases .The global burden for human cystic echinococcesis was recently estimated more than that for onchocerciasis and almost the same as that for African trypanosomiasis (Craig *et al*.2007). Cestodes parasite infections in cattle are of the major importance in many areas and are a primary factor in the reduction of production and productivity of livestock. The losses caused by parasites can be distinguished in to direct and indirect losses. Direct losses include those due to acute illness and death and condemnation of organs and carcasses at meat inspection, whilst indirect losses include the mitigation of productive potential such as decreased growth rate, weight loss in young growing animals and late maturity of slaughter stock (Hansen and Perry, 1994).). Severe losses of production can occur in herds suffering from sub-clinical helminths infections even when animals appear to be healthy (Allonby and Urquhart, 1975). The primary factors affecting the development and survival of the eggs and free-living larvae are temperature and moisture and different parasites vary in their ability to survive extremes of temperature and moisture. There is a marked seasonal fluctuation in number and availability of infective stages on pasture. The causes for this conveniently grouped as factors affecting contamination of the environment and those controlling the survival, development, dissemination and availability of free-living stages and/or intermediate hosts (Levine, 1985). In spite of the large population of cattle, productivity in Sudan is low due to poor nutrition, reproduction insufficiency, management constraints and prevailing animal disease, which is similar to Ethiopia situation (Alsan, 2012). Gastrointestinal parasites are considered as the major diseases of cattle in the country. Translation mainly depends on seasonal climatic changes and certain management practices. The level of environment contamination is influenced by factors including biotic potential of helminths, host immune status and hypobiosis (Armour *et al.,* 1988). The most important helminths parasites in cattle include nematodes (round worms), trematodes (flukes), and cestodes (tapeworms). These parasites are a worldwide problem for both small and large-scale farmers, but there is a greater instance in sub-Saharan Africa in general and Sudan in particular due to the availability

of a wide range of agro-ecological factors suitable for diversified hosts and parasite species (Tesfaye, 2009). Little is known about the species, distributions and infection rate of GI helminths parasites in Tulo district. Hence, studies comprising the identification of cestodess and their epidemiology are essential. Therefore the objectives of this study were to estimate the Prevalence and risk factors associated with cestode worms' infection in cattle from White Nile state and to investigate risk factors associated with the disease in Bovine in White Nile state.

MATERIALS AND METHODS

Study area: This study was carried out in El-Dwaem slaughterhouse which is located in El-Dwaem town, the capital of the White Nile state. The town is located in the northern part of the state which lies between the latitudes 12°N and 13.3°N and the longitude 31°E and 33.3°E. It has an area of 30.411km² and estimate population of approximately 1188707. In the slaughterhouse cattle and small ruminants are slaughtered and processed in separate holes. Ante-mortem and post-mortem examinations are conducted by trained veterinarians. Animals are slaughtered in El-Dwaem slaughterhouse only for domestic consumption.

Study design and sampling: A cross-sectional study design was used in the period between July 2015 and September 2015. Animals were selected by random systematic sampling at ante-mortem.

Sample size*:* The total number of cattle required for the study was collected based on the formula given by Martin *et al* (1987).The total number of the samples were 184 animals (Thursfield, 2007)

$$n=4PQ/L^2$$

Where

n =number of animals to be sampled.

P=expected prevalence of Fasciolosis which was 3.5% (Nada, 2015).

Q=1-P

L=allowable error

Accordingly, n was calculated to be 212andwas multiplied by 2 to increase precision (Thursfield, 2007).

Ante-mortem and post-mortem examinations: Cattle were examined randomly during post mortem inspection and this was carried out according to the method described by Thornton's and Gracey (1981).

Examination of fecal samples: Technique for fecal egg counts (FEC) were determined by the modified McMaster technique, using floatation methods for cestodes worm were used (Soulsby, 1982). The test tube flotation technique was employed in analyzing the collected fecal samples. The fecal samples were analyzed in the following manner: 2g of fecal sample was mixed thoroughly (using an applicator stick) with about 2mls of normal saline

solution in a test tube, the sample was then homogenized by stirring with the same applicator stick and the test tube filled to the brim with a saline solution. A cover slip was placed on the test tube and the test tube was placed inside a test tube rack undisturbed for about 15-20minutes to allow eggs of lower density float to the surface of the saline solution and adhere to the cover slip. The cover slip was finally taken off the test tube, placed on a sterile slide and air-dried. The preparation was then stained with hematoxylin for contrast and subsequently viewed under the light microscope with magnification of 40X, 100X and 400X. The flotation medium used for cestode eggs was sugar solution with a specific gravity of 1.2 (Thienpont, 1986). To complement the information on the samples collected, a questionnaire was administered and information on origin, sex, breed, age, body condition and grazing type were also recorded.

Statistical analysis: Data collected from the active abattoir survey about the risk factors and the results was entered into Excel spread sheet, cases were categorized as either positive or negative and analyzed using Statistical Package of Social Science (SPSS) version 16 were used. Frequency table of the distribution according to the potential risk factors were constructed. Cross tabulation of Cestode infection per according to potential risk factors was made. Univariate analysis: chi-square test was used to describe the variables, number of tested animals and degree of freedoms, chi-square p-value. Multivariate analysis: by logistic regression models were described the risk factors, number of positive cases, odds ratio, confidence intervals and p-value. Multivariate analysis by logistic regression models was performed for risk factors significant at level (≤0.25) in univariate model. The significant level in the multivariate analysis was (≤0.05).

RESULTS

Among the total of 184 cattle inspected 106 (57.6%) animals were positive to cestode species (table 1). While cestode eggs in the fecal samples represented 69.6%.

Table: (1) Distribution of cestode species among 184 cattle examined in El-dwaem slaughterhouse – White Nile State

Item	Frequency	Percent
Positive	106	57.6
Negative	78	42.4
Total	184	100

Table 2 showed the distribution of 184 cattle and the number of infected animals was 118 (78.7%) in White Nile locality, but 66 (35.8%) of these animals were negative. According to sex 114 (77%) Males were infected

by these parasites. While 36 females showed the infection.

Table (2)Summary of univairate analysis of the association between potential risk factors in 184 cattle examined for cestode species in El-dwaem slaughterhouse White Nile State.

Risk factor	No. tested	n. positive	%	df	Expected no	Chi-sq
Origin				1		34.568a
White Nile	150	118	78.7		88.0	
Kordofan	34	20	58.8			
Sex						68.750a
Male	148	114	77	1	88.0	
female	36	24	66.7			
Breed	150	118	78.7			
Kenana	34	20	58.8	1	88.0	
Baggara						
Age	102	98	96			2.273a
5year				1	88.0	
2year	82	40	48.8			
Body condition						
Good				1	88.0	1.841a
poor	105	65	61.9			
	79	73	92.4			
Treatment			54			
Yes	100	54		1	88.0	71.273a
No	84	84	100			
Grazing						76.455a
Open	154	138	89.6	1	88.0	
close	30	0	0			

The age and the type of the breed of these animals were recorded in table 2. The animals with good body condition were 105 animals, but 65 (61.9%) were positive to cestode species. Whereas, 74 animals with poor body condition were showed the infection rate of 92.4%. Some of the owners were treated these parasites (54%). The animals that were grazing in open areas were 154 animals but 138 (89.6%) animals were infected, while no infection in the animals in closing areas (0.0%). Multivariate analysis of cestode species and potential risk factors in184 cattle examined at slaughterhouse using regression were showed significant association with age, sex, grazing type, use of treatment and body condition.

Table(3) Summary of multivariant analysis of the association between potential risk factors in 184 cattle examined for cestode species in El-dwaem slaughterhouse

	Age	sex	Grazing	Use of treatment	Body condition
chi-sq	2.273a	68.750a	76.455a	71.273a	1.841a
Df	1	1	1	1	1
Asymp.sig	.132	.000	.000	.000	.175

DISCUSSION:

The results of the current study demonstrate that there is high prevalence (77.1%) of gastrointestinal parasites among the cattle slaughtered for consumption in Akure metropolis. This result is a reflection of the quality of meat consumed in the area. Bovine cestodiasis is usually characterized by chronic, sometimes acute or sub acute inflammation of the infected organs ,accompanied by akness, anaemia, anorexia, general intoxication, vague, abdominal distention and nausea and death. The prevalence of hydatid or cestode infection. In this study This might to be due to the variation in environmental condition because ,asit known that the eggs survive for only short period of time if they are exposed to direct sunlight and dry conditions, E. granulosus remain viable for several months in pasture or gardens and on house hold fomites ,also the eggs survive best under moist conditions and moderate temperature [OIE,2005].In the univariate analysis ,only body conditions, grazing and presence of dogs and snails were associated with detection of the worms in the The occurrence of cestodiasis infection in relation to the location of cyst and larvae in animals was high in liver. This study further 66.9% was higher than the prevalence in other studies in Sudan, which was 1,6% in north kordofan,(Khalid, 2014). 1.4% in Khartoum state (mohamadin, and abdelgadir, 2011). On the other and the prevalence of hydatid disease recorded during this study is higher than the results in other studies which was 4.9% in Ethiopia (formsa and Jobre, 2011). 8.4% in Lybia (AI.khaldi.,1998),11,1% in Iran (Dalimietal.,2002),11.1% in Irag (sadia and nouradine.,2011),12.6% in Sudia Arabia (Ibrahim.,2010),.12.9% in Jordan (Kamhawietal.,2012).

organs and there eggs in feces. However origin of the animal, sex, breeds, age and whether it received a dose of antihelmentic treatment did not have influence the prevalence of the worms or their eggs. Xildirimet al.[2007].observed that age of animals low effect on this infection by cestode57,1% in good condition and 42,9% in poor condition and [p. value=1,834].The prevalence cestodiasis as related to breed of animals was 75%in balady or White Nile breed [p. value=,578].

revealed that the prevalence of parasites between male (77%) and female cattle (66.7%) is significantly different ($P < 0.05$).

This shows that the male cattle are more susceptible to the gastro-intestinal parasites than the female cattle. A similar result has been reported by Shitta (2013), the author reported a prevalence of gastrointestinal parasite in male cattle (38.04%) as compared to that of their female counter parts (32.10%) in Adamawa State. This variation in infection rates between genders of cattle has also been reported by Yohanna *et al* (2012). The authors observed a prevalence of (72.2%) in male as against that of the female examined (44.0%) in Jos abattoir.

There was significant association between cestodiasis infection and location of cysts (p. value=0.00).This findings are consistent with observations reported in Libya (Ibrahim and Craig, 1998). Iran (Tappe *et al*., Sudan and Kenya (Njoroge *et al.*, 2002). The liver was the most common site of infection in cattle, this could be due to the fact that liver first organ the

2010, and Khanjari *et al.*,2012). Ethiopia (Fikireet al.,2012]. Sudan [Mohamadin and abullahi *et al.*, 2011). Muritania (Salem *et al.*,2011). sudia Arabia (Ibrahim, 2010).

Fertility of cyst is an important factor that can effect stability of E. granulosus cycle depending on geographical situation kind of infected host and size of cust.in our study was significant association between hydatidosis and fertility of cyst. In conclusion and recommendations The use antihelmentics by cattle farmers from period to other is recommended as a prophylactic measure but also how to correctly use these chemicals and

blood flows through after leaving the intestine and fitered in it. the ova that are not trapped in the liver passed the lungs then other organ (Soulsby, 1982).
this study concluded that the blood sucker parasite, cestodiasis were prevalent in liver and lungs of slaughtered cattles and feces in el,dwaem slaughter of snails and dogs and waterbody were associated with the disease in univariate analysis .

the hazard that might possibly arise to animals and consumers if not appropriately used should be explained.

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