



Flatworms (Platyhelminthes) Associated with Slaughtered Cows in Abattoirs Found in Bali Town Taraba State Nigeria

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Abstract:

Background: Flatworm infections are among the most common type of infections occurring mostly in underdeveloped and developing countries resulting in malnutrition and deaths in some cases.

Aim: This study was carried in order to determine the type of flatworms often associated with cows slaughtered in Bali abattoirs with a view to knowing their prevalence rate.

Method: Collection of samples took place in the morning hours from 6:30 am-7 am daily during the sampling periods from January 2017 to December 2017. A total number of 140 samples were analyzed by ultra-centrifugation, staining and microscopy techniques.

Results: The infection rate was found to be higher in male cows than in female cows. The results further showed that flatworm infestation in the infected cows was as a result of poor water, improper livestock management, and contamination of the cow's food with cyst of helminthes. *Fasciola hepatica* infestation was highly prevalence when compared with *Taenia saginata* with the lowest percentage prevalence rate.

Conclusion: The study therefore, showed that *Fasciola hepatica* and *Taenia saginata* were the only dominant in male cows with 72 % prevalence rate while the female cows have the least prevalence rate of *F. hepatica* and *T. saginata* infections. In all, *Fasciola hepatica* had the highest incidence rate leading to fascioliasis in the cows and in some cases human.

Keywords: Flatworms, Platyhelminthes, *Taenia saginata*, *Fasciola hepatic*, Slaughtered cows, Bali.

1. INTRODUCTION

Parasitic Platyhelminthes infection is still posed serious public health problems in the world. It is estimated that about 1.5 billion people are affected, and 400 million are ill as a result of these infections [1]. The high prevalence rate in young people is attributed to many factors, particularly the social and economical situation of the individuals, which is the main cause of this high prevalence of parasitic Platyhelminthes, as well as unkempt environment, poor sanitation and lack of personal hygiene [2].

Parasitic Platyhelminthes infections are among the most common infections occurring throughout the developing world. The main transmission routes for most of the parasitic Platyhelminthes are fecal-oral, contaminated foods or water. Parasites such *Entamoeba histolytica*, *Ascaris lumbricoides* (hookworms), *Necator americanus*, *Ancylostoma duodenale*, and whipworm (*Trichuris trichiura*) are the major causes of water and food-borne disease globally [3]. Such infections are linked to lack of sanitation, lack of access to safe water and improper hygiene as well as poverty. These infections deprive the poorest of the good health thereby contributing to economic instability and social marginalization. The poor people of undeveloped nations experienced a cycle where under nutrition and repeated infections lead to excess morbidity that can continue from generation to generations. People of old ages are infected by this cycle of prevalence parasitic infections, especially communalized area such as villages and farm settlements [4].

A number of Platyhelminthes are natural parasites of man. The parasite form termed helminthes infections may evoke especially low level of infection. In heavy infections, symptoms as entirely non-

pathogenic. A heavy helminthes load results from repeated infections because, as a rule, helminthes do not multiply inside their definite hosts and infect new animals before they can develop to maturity. There are few exceptions to this general rule, for example, the egg of *Hymenolepis nana* (the dwarf tapeworm of man), can also hatch and developed to adult in the human gut.

The world health organization (WHO) estimated that more than one billion of the world's population is chronically infected with soil-transmitted helminthes (STH). The high prevalence rate of these infections is closely corrected with poverty, poor environmental hygiene and impoverished health services [5]. These infections occur in all region of Africa and its public health importance has been demonstrated by a number of studies both in Nigeria [6-9], and elsewhere [10]. It is endemic in both rural and urban population and it is posing a great threat to public health in developing countries. It has been shown to cause lack of appetites, intestinal abnormalities, poor absorption or increased loss of nutrient, which may result in protein-energy malnutrition and anemia. Global estimated prevalence rate of anemia in hookworm infection and a cognitive as well as improvement of infection, indicate that for each parasite, 10-50 million persons may be infected [11].

These parasite are widespread in the environment and major disease out-breaks have occurred as a result of contaminated drinking water and food. Recently, it has been estimated that one quarter of the world's populations is infected with one or more parasites. *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms collectively referred to as soil-transmitted helminthes are the most common intestinal parasites. *Ascaris lumbricoides* is the largest and most common nematode parasitizing the animal as well as in human intestine and currently infects about one billion people worldwide [12].

This study was carried out in order to determine the type of flatworms found in slaughtered cows at Bali abattoir.

2. MATERIALS AND METHODS

Most of the materials and apparatus used throughout the study were provided for by the laboratory where this study was largely carried out, while others were purchased from the suppliers. The materials and apparatus used in the study include: hand gloves, forceps, razor blade, hand lens, sterilized universal container, microscope slides, scanning biological microscope, cotton-wool, normal saline (3 mL by 10 % volume), pasture pipette, applicator stick, etc. All glassware, slides, forceps, and universal containers were sterilized using an autoclave at 121°C for 30 min.

2.1. Specimen Collection

The samples were collected from the liver and intestine of slaughtered male and female cows that were slaughtered by 7 am daily. Samples were collected in small sterilized polythene bag and then taken to the laboratory immediately and stored in the refrigerator at -4 °C for further use. Sample collection was done each morning for one week in randomly selected months. A total number of five (5) cows consisting of 3 males and 2 females were slaughtered on daily basis according to the demand of beef by Bali people. A total of 140 samples were collected during the sampling periods.

2.2. Samples Analysis

A drop of normal saline (3 mL of 10% volume) was placed on grease free slide using pasture pipette. About 0.5g portion of the liver, intestine was placed on the slide using applicator stick after ultra-centrifugation at 1000 rpm. This was mixed properly and then observed using a scanning biological microscope under 400 X objectives, and observations of cyst and eggs were recorded.

2.3. Data Analysis

Data generated was subjected to simple percentage to determine the differences in terms of abundance of the species of the Platyhelminthes.

3. RESULTS AND DISCUSSION

The results for the prevalence rate of Platyhelminthes associated with slaughtered cows in our study was as shown in tables 1 and figures i -ii below. The beef used in this study is an important commercial commodity due to its protein values, and also due to its inexpensive nature. As a results of this, beef are widely consumed in Bali town and its neighboring communities and villages. The knowledge of the type of Platyhelminthes in slaughtered cows is necessary for effective safe guard against consumption

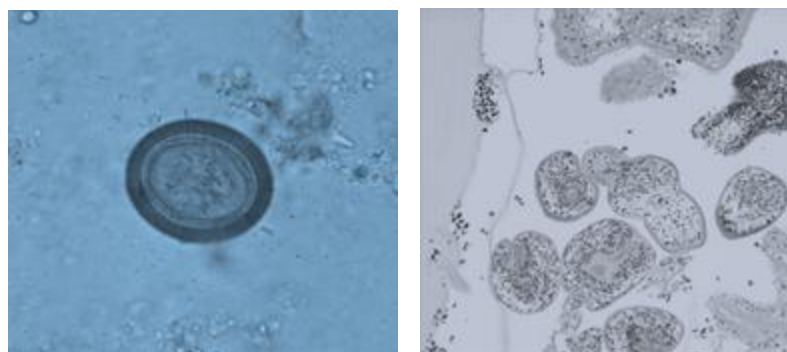
of the improperly cooked meat usually contaminated with the eggs and cysts of Platyhelminthes. Platyhelminthes burdens were high in the months of December (36 %) and April (27 %) (Table 1). This is could be due poor grazing by the cows during these months as a result of lack of pasture or foliage for grazers, thus, making the animals prone to helminthes infection.

Table1. Flatworm prevalence in slaughtered cows in Bali abattoir from January to December 2017

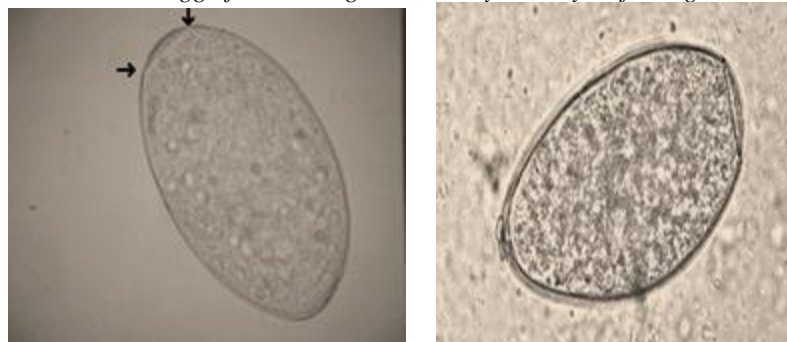
Slaughtered cows with flatworms (male/female)						
Flatworm	JAN	APR	AUG	DEC	% Prevalence	Total (%)
<i>Fasciola hepatica</i>	8/3	9/6	7/9	9/9	33/27	50.81
<i>Taenia saginata</i>	6/6	8/4	11/4	7/11	32/25	48.31
Total worms = 118						

Results are sampling of the total number of cows slaughtered in each of the sampled months.

The result of our study showed that parasitic Platyhelminthes were highly present in the samples analyzed within this periods (Table 1). It further showed that helminthes such as *Fasciola hepatica* and *Taenia saginata* were present in the as seen from the presence of their eggs and cysts (Plate i a-c), with *F. hepatica* being the most prevalence. This could be attributed to the ubiquitous nature of the parasites. Besides, meat is rich in nutrient and this may be susceptible to the helminthes for their own metabolic activities.



a. Unstained egg of *Taenia saginata* b. Hydatid cyst of *T. saginata* 400X



c. Stained egg of *Fasciola hepatica* in slaughtered ♂ and ♀ cows respectively

Plate i: Microscopic features observed in collected samples from Bali abattoir 400X

The abundance of these helminthes could be due to the fact that they produced spores which help to distribute them widely in their environment, thereby contaminating foods such as grasses fed upon by these cows. Beside, their eggs are covered with cuticle which help them resist harsh climatic condition of their environment. The presence of parasitic Platyhelminthes in the slaughtered beef may be as a result of improper maintenance and care of slaughtered cows. This was due to the fact that most of the butchers were not knowledgeable especially in animal cares. The study also showed that *T. saginata* infestation was prevalence in weeks 2 and 3. *Taenia saginata* for instance, obtained its food by absorption across the tapeworm's flat body membrane. Carbohydrates from the host are the most important for *T. saginata* to absorb in the form of polysaccharides. This form is easiest for the worm to breakdown into the usable form of glucose. It is possible that the parasite adopt this mechanism in the cows, and when the animals were slaughtered, the parasite continues its life cycle in humans when improperly cooked beef is eaten by the human's example roasted "suya" meat in most northern states of Nigeria.

Fasciola hepatica was the most prevalence flatworms in the slaughtered cows (Table 1, Figure i and ii). The adult *F. hepatica* develop from metacercaria (Plate ic) after they penetrate through gut and lodge in the liver and then gall-bladder and bile duct. The gall-bladder and duct may become distended, fibrotic and calcified. Large numbers migrating through liver cause hemorrhage causing a disease known as fascioliasis in the cows and sometimes in humans who subsequently eat not properly cooked beef. This adversely affects the quality of meat production. It has a sucking pharynx and a blind gut (no anus). It sucks in bile and inflammatory exudates and digests this. This may be due to the location of parasite in the liver as well as adaptation in its environment [15]. Both helminthes were seen to be prevalence in male cows than the female cows.

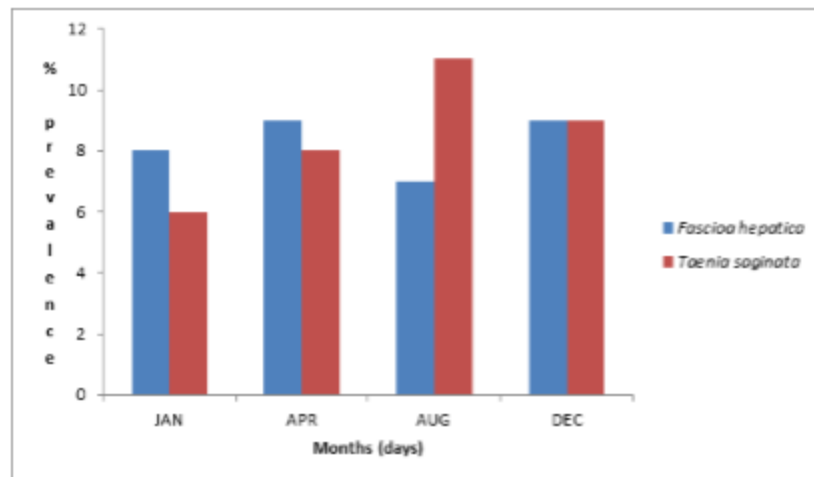


Figure1. Flatworm prevalence according to the months of slaughtering

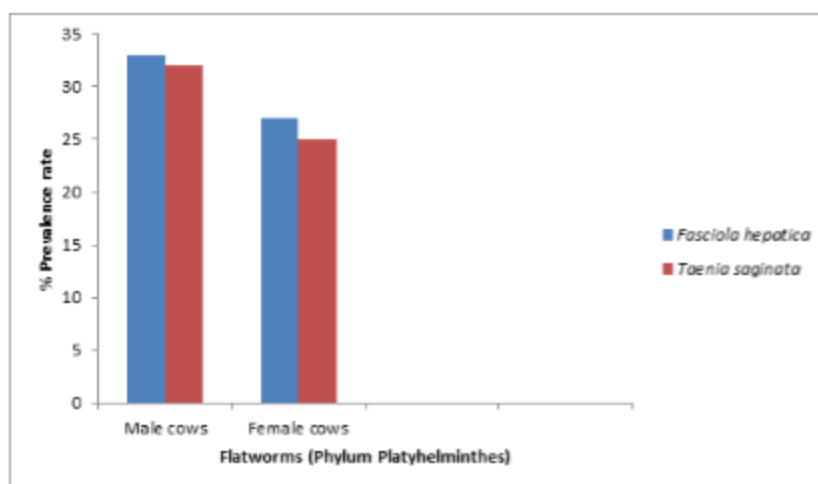


Figure2. Flatworm prevalence according to the sexes of the cow

This may be due to the fact that the body physiology of the male cows favors advance parasitaemia than the female cows or because of excessive deposition of fat in the adipose tissue of male cows than the females. The result may not be different from the above observation which correlates with the findings of various researchers [13-18]. This report might be due to improper cleaning of cow’s surroundings and contaminated food as well as water.

4. CONCLUSION

Helminthes parasite infection in slaughtered cows in Bali abattoir is quite high with *Fasciola hepatica* (liver fluke) being the most prevalence. This was due to improper disposal of human wastes which resulted in the pollution of the surrounding environment where the animals grazed, and lack of adequate animal care of the environment where the cows usually grazed before they are taken to local markets for sale. This is also complicated by various unhygienic practices by people living in Bali town. Base on the findings from this study, the following recommendations were put forward: meat should be

properly cooked before eating so as to destroy the cyst of these helminthes, slaughtering and rearing of cows should be done in hygienic environments by skilled persons to prevent flatworm infection.

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