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Research Article

Prevalence of *Taenia* Species among Cattle Slaughtered in Oye Local Government Area, Ekiti State, Nigeria

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ABSTRACT
This study investigates the prevalence of *Taenia* species among cattle slaughtered in Oye, Ekiti State. *Taenia* poses a zoonotic threat through the consumption of undercooked or contaminated beef. The research was carried out through field sampling and in selected abattoirs across the study area, where infected tissues were screened for the presence of cystic stages of *Taenia* Spp. Standard diagnostic approaches, including visual meat inspection and parasitological identification techniques, was used to detect and classify parasite present. In addition to assessing prevalence, the study considered patterns of co-infection with other gastrointestinal parasites and the role of environmental factors such as slaughter hygiene, animal sourcing, and grazing practices in disease transmission. Overall, 20% of the cattle were infected, with females showing a higher prevalence (12%) compared to males (8%). Infection rates varied by location, with Irare and Oye-Egbo recording equal infections (8%) and SY8 a lower rate (4%). The findings highlight the ongoing public health risks posed by parasitic infections in livestock, particularly in areas where meat inspection procedures are inconsistent or poorly enforced. This research underscores the need for improved veterinary services, routine screening, and health education targeting livestock handlers, butchers, and consumers. It also supports the implementation of stronger food safety policies under a One Health framework, considering the interconnectedness of human, animal, and environmental health. By providing data on the parasitic status of slaughtered cattle in Oye, this study contributes to the broader understanding of zoonotic disease dynamics in southwestern Nigeria and informs future strategies for management.

Keywords: Beef; Gastrointestinal; Parasite; Prevalence; *Taenia saginata*

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INTRODUCTION

In developing nations, parasitic diseases—especially those brought on by zoonotic helminths—continue to pose a serious threat to food safety and cattle output. The beef tapeworm, *Taenia saginata* is one of them that poses a threat to worldwide public health and the economy. *Cysticercus the* parasite's larval stage, lodges in muscle tissues in both humans and cattle, which serve as definitive and intermediate hosts, respectively, throughout its life cycle (Eichenberger *et al*., 2020; Assana and Zoli, 2024). Humans contract taeniasis, a gastrointestinal

illness that can cause mild to moderate digestive difficulties, by eating raw or undercooked beef that contains viable cysticerci (Ahmed *et al*., 2020). Bovine cysticercosis, a disease brought on by *T. saginata* larvae, has a major effect on the quality of meat and financial gains in the cattle industry. Farmers, butchers, and processors suffer financial losses as a result of the disease since it causes carcasses to be condemned or downgraded during meat inspection (Gebrie and Alemneh, 2015; WHO, 2022). Inadequate meat inspection services provide a concern to public health, particularly in regions where eating undercooked beef is a custom (Hossain *et al.,* 2023). Variable prevalence levels have been reported in studies conducted throughout Africa. According to Ahmed *et al.* (2020), molecular surveillance in Egypt showed a comparatively low frequency of 0.34%.

While prevalence rates in Ethiopia and Nigeria, especially in areas with inadequate inspection procedures, have been reported to range from 10% to over 25% (Dada *et al.,* 2019; Mega Meta-analysis, 2021). Poor public knowledge, insufficient veterinary care, and a lack of infrastructure exacerbate the issue in Nigeria, particularly in rural and semi-urban areas.

Cattle are frequently killed at unofficial slaughter slabs in southwest Nigeria, specifically in the Oye Local Government Area (LGA) in Ekiti State, with little to no veterinary supervision. There is a significant knowledge gap about the prevalence of zoonotic illnesses like taeniasis since these local institutions are frequently left out of national surveillance systems (Eyo *et al.,* 2018).

The urgent need for localized epidemiological data to guide customized interventions is highlighted by recent research advancements, such as immunodiagnostics, control techniques like the TSOL18 vaccination in pigs, and potential applications in cattle (Hossain *et al*., 2023; Assana and Zoli, 2024). In order to guide future research, veterinary care, and public health policy, this study attempts to determine the prevalence of Taenia species in slaughter cattle in

MATERIALS AND METHODS

Study Area

Nigeria's Oye Local Government Area is situated in the southwest of the country in Ekiti State (Figure 1). Agriculture is the backbone of the local economy in this largely rural area. For many households, raising cattle is an integral element of their livelihood, along with growing crops. With different wet and dry seasons that affect livestock health and the frequency of parasite infections, the region is known for its tropical climate. Heavy rains and higher humidity during the April–October rainy season provide the perfect environment for gastrointestinal parasite survival and spread.

However, even though there is less rainfall and humidity during the dry season (November to March), some parasitic larvae and eggs can still survive on pastures and in the environment during this time. Cattle are frequently permitted to graze freely in communal pastures in Oye LGA, where the land is primarily used for agriculture. Cattle are more susceptible to parasitic diseases under this grazing method because polluted pastures and water sources offer vectors for the spread of parasites. Additionally, some parts of Oye LGA have swamps, stagnant pools, and wet fields, which facilitate the spread of trematodes, especially *Fasciola hepatica* which infects cattle with liver flukes (Ajayi *et al*., 2021).

Study Population

The target population consisted of cattle in Oye LGA of different ages, sexes, and management. The goal of the selection process was to get a representative sample of the cattle population. Male and female cattle were sampled, and cattle of all ages—young, adult, and mature—were included.

Study Design

Fecal samples were taken at one particular moment from a few chosen cattle ranches as part of a cross-sectional study design. The prevalence and severity of gastrointestinal parasite infections in the Oye LGA cattle population may be estimated thanks to this design. To reduce selection bias and guarantee representation of all cow kinds in the area, a random sample procedure was used from cattle herds throughout the study area.

Sample Collection

Fresh stool samples were collected inside a plastic container early morning, labeled with the name and sex of the animal which was later transported to the laboratory for identification of *Taenia* Spp and other opportunistic parasites. The samples were collected several times (Eyo *et al.,* 2018).

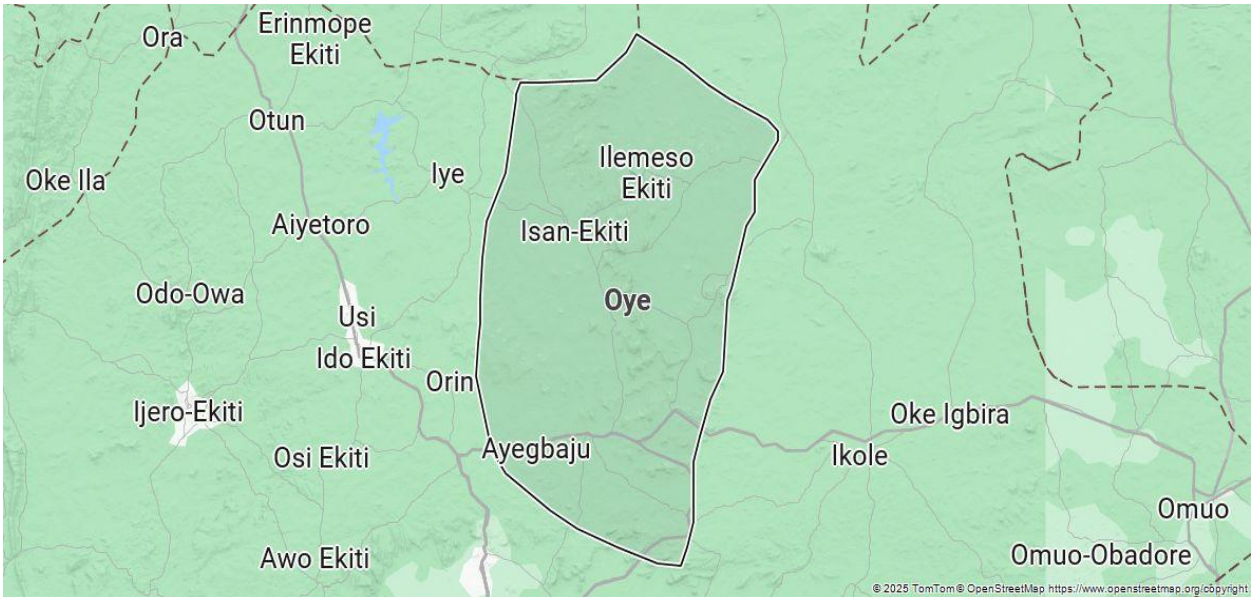

Figure 1. Map of Ekiti State showing Local Government Areas and the Study Area

Laboratory Preparation of the faecal Sample

In a 15 mL test tube, 1 gram of feces was thoroughly combined with 7 mL of 10% formal saline. The mixture was then filtered into a different test tube using a 200 µm aperture sieve. After centrifuging the suspension for three minutes at 2000 rpm, the supernatant was carefully decanted. Twelve milliliters of formal saline were added to the sediment, thoroughly mixed, centrifuged one more, and the supernatant was carefully decanted. To break up the silt, eight milliliters of buffered alcohol (H_2PO_4) were added, and the mixture was agitated using a wooden applicator. After adding four milliliters of ether, the tube was shaken briskly to ensure that everything was well combined. After centrifuging the mixture for one minute at 1500 rpm, the supernatant was carefully decanted. The leftover material was filtered once more through a 200 µm screen into a sterile 15 mL centrifuge tube after being diluted with 3 mL of regular saline. After letting the filtrate stand for fifteen minutes, the supernatant was decanted, and a Pasteur pipette was used to put the sediment onto a microscope slide. To retrieve any leftover silt, four drops of saline were used to rinse the tube. After examining the prepared slide at 10x and 40x magnifications using a light microscope, gastrointestinal parasites such as eggs, cysts, or oocysts were found (Hossain *et al.,* 2023).

Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 27 was used to evaluate data gathered from the analysis of fecal samples for the presence of *Taenia* Spp. The prevalence of *Taenia* infections in various locales, sex groups, and co-infection categories was ascertained using descriptive data, such as frequencies and percentages.

RESULT

Prevalence of *Taenia* Spp. by Location and Sex

The Table one (1) examined faecal samples from 50 cattle collected across three locations: Irare, Oye-Egbo, and SY8. Out of the 50 samples, 10 cattle (20.0%) tested positive for *Taenia* Spp. infection.

When analysed by sex, male cattle recorded 4 cases (8.0%), while female cattle recorded 6 cases (12.0%). By location, both Irare and Oye-Egbo each recorded 4 infected animals (8.0%), while SY8 recorded 2 infected animals (4.0%). Notably, no infections were recorded in male cattle at Irare, while no female infections were found at SY8.

This shows that infection with *Taenia* Spp varied slightly across both locations and sexes. The higher infection rate among females could be due to differences in management practices or level of exposure to contaminated environments.

According to the data in Table 2, all positive cases of *Taenia* Spp. occurred as double infections. There

were no single infections of *Taenia* Spp. detected among the 50 cattle examined. Specifically:

10 cattle (20.0%) had *Taenia* Spp. as part of a double or multiple infection

10 cattle (20.0%) had other parasites without *Taenia* Spp. involvement

30 cattle (60.0%) were negative for all types of *Taenia* Spp. infection

The absence of single infections in table two (2) suggests that *Taenia* Spp. may often co-exist with other intestinal parasites, possibly due to shared transmission routes such as contaminated food, water, or grazing areas.

Co-Infection Patterns Involving *Taenia* Spp. (Mixed Infections)

In Table three (3) below, several types of mixed infections involving *Taenia* Spp. were recorded. In total, 10 different co-infection patterns were identified, with *Taenia* Spp. occurring alongside parasites like *Toxocara* Spp., *Fasciola* Spp., *Strongyloides* Spp., *Cryptosporidium* Spp., *Eimeria* Spp., *Moniezia* Spp., *Trichuris* Spp., *Capillaria* Spp., and *Buxtonella* Spp.

Examples of notable combinations include:

Taenia Spp*, Toxicara* Spp and *Fsciola* Spp (Oye Egbo)

Taenia Spp*, Moniezia* Spp*,Fasciola* Spp*,Cryptosporidium* (Irare)

Taenia Spp*. + Capillaria* Spp*. + Strongyloides* Spp*. + Toxocara* Spp*. + Fasciola* Spp*. + Buxtonella* Spp*. (SY8)*

These complex infections shows that cattle in these areas are exposed to a wide range of parasites. It also suggests that the environment especially pasture and water sources—may be highly contaminated.

Table 1. Prevalence of *Taenia* species in relation to locations and gender

Location	Male	Female	Total
Irare	0 (0.0)	4 (8.0)	4 (8.0)
Oye Egbo	2 (4.0)	2 (4.0)	4 (8.0)
SYB	2 (4.0)	0 (0.0)	2 (4.0)
Total	4 (8.0)	6 (12.0)	10 (20.0)

Table 2. Prevalence of *Taenia* species in relation to infection status

Location	No of parasite	Single	Double	None *Teania*	Total
Irare	3 (6.0)	0 (0)	4 (8.0)	11 (22.0)	18 (36.0)
Oye Egbo	1(2.0)	0 (0)	4 (8.0)	8 (16.0)	13 (26.0)
SYB	6 (12.0)	0 (0)	2 (4.0)	11 (22.0)	19 (38.0)
Total	10 (20.0)	0 (0)	10 (20.0)	30 (60.0)	50 (100.0)

Table 3. Prevalence of double parasite of *Taenia* species

	Irare	OyeEgbo	SYB	Total
.Taenia Spp+ Toxocara Spp+ Fasciola Spp	0	1	0	1
Taenia Spp + Toxocara Spp + Eimera Spp + Moneiza Spp+ Strongyloides Spp+ Trichu	0	1	0	1
Taenia Spp+ Monieza Spp+ Faciola Spp+ Cryptosporidium Spp	1	0	0	1
Taenia Spp+ Toxocara Spp+ Strongyloides Spp+ Fasciola Spp	0	1	0	1
Taenia Spp + Toxocara Spp + Monieza Spp + Buxtonella Spp	0	0	1	1
Taenia Spp+ Capillaria Spp+ Strongyloides Spp+ Toxocara Spp+ Fasciola Spp+ Buxtonella Spp	1	0	0	1
Taenia Spp+ Toxocara Spp+ Strongyloide	1	0	0	1
Taenia Spp+ Fasciola Spp	1	0	0	1
Taenia Spp+ Strongyloides Spp	0	1	0	1
Taenia Spp+ Strongyloides Spp+ Fasciola	1	0	0	1

DISCUSSION

The current study investigated the prevalence and parasitic co-infection patterns of *Taenia* Spp in

slaughtered cattle across three locations in Oye Local Government Area, Ekiti State. Out of 50, cattle examined for the presence of *Taenia* Spp, the prevalence was found to be 10 (20%) all within mixed (double or multiple) parasitic infections. This prevalence is consistent with findings by Dada *et al.,* (2019), who reported *Taenia* infection as a recurring concern in Nigerian abattoirs due to poor meat inspection and hygiene practices.

Among the locations, SY8 recorded the highest number of cattle free from *Taenia* (12.0%), while Irare and Oye Egbo each had four cases of *Taenia*-related infections (8.0%). But SY8 still showed signs of complex mixed parasitic infections, even though single *Taenia* infections were completely absent across all locations. The absence of single *Taenia* infections may suggest that the parasite tends to coexist with other intestinal parasites in environments with poor sanitation or high exposure risks, as supported by Eyo et *al*., (2018).

In terms of gender distribution, female cattle showed a slightly higher infection rate (12.0%) than males (8.0%). This trend aligns with findings by Ajayi et al., (2021), who observed that female cattle, especially those kept longer for breeding or milk production, may be more exposed to environmental contamination due to prolonged housing or contact with shared water sources.The study also revealed that *Taenia* was part of several complex co-infection patterns. Out of 10 total *Taenia*-infected cattle, various combinations with other parasites were recorded, such as:*Taenia* Spp. + *Strongyloides* Spp. (2.0%), *Taenia* Spp. + *Toxocara* Spp. + *Fasciola* Spp. (2.0%), *Taenia* Spp. + *Toxocara*, *Eimeria*, *Moniezia*, *Strongyloides*, and *Trichuris* Spp. (2.0%)

These findings underscore the high level of polyparasitism in the cattle population, particularly in Oye Egbo and Irare. According to Hendrickx *et al*. (2019), such multi-parasite infections can severely impact cattle health, leading to reduced weight gain, organ damage, and even condemnation of meat during inspection. Of special note is the detection of *Taenia* Spp. in combination with *Cryptosporidium* Spp., recorded in Irare. This specific pairing suggests the possibility of exposure to both fecal-oral protozoan transmission and cestode infections via poorly managed grazing lands or contaminated water. Ahmed *et al*. (2020) emphasized that shared water bodies and unsanitary feeding environments are key sources of both cysticercosis and protozoan infections in cattle. The frequent co-infection of *Taenia* with *Fasciola*, *Strongyloides*, and *Toxocara* Spp. also points to overlapping transmission routes and the likely presence of infected intermediate hosts in the environment. According to Hossain *et al*. (2023), the lifecycle of *Taenia saginata* involves cattle becoming infected after ingesting human feces-contaminated feed or water containing *Taenia* eggs, especially where open defecation is common and veterinary supervision is poor.

Despite variations in location-based prevalence, the overall infection rate of 20% is still a public health concern, particularly given the zoonotic nature of *Taenia saginata*. The World Health Organization (2022) highlights that poor meat handling and undercooked beef consumption are major pathways for human taeniasis, especially in developing countries. Additionally, the presence of *Taenia* Spp. in cattle from all three locations confirms that cysticercosis remains endemic in this region. As noted by Assana and Zoli (2024), effective control of *Taenia* infections requires a One Health approach for improving not only animal health surveillance but also sanitation, food safety practices, and public education.

Moreover, the fact that all *Taenia*-positive cattle were involved in multiple parasitic infections further complicates treatment and control. Co-infections can mask clinical signs, reduce drug efficacy, and cause greater economic losses due to liver condemnation, reduced carcass weight, and poor meat quality (Gebrie and Alemneh, 2015; Mega Meta-analysis, 2021). Among the more complex co-infections, one cattle in SY8 showed six different parasite species, including *Taenia*, *Capillaria*, *Strongyloides*, *Toxocara*, *Fasciola*, and *Buxtonella* Spp. This level of infection suggests heavy environmental contamination and lack of effective parasite control programs. Sadiq *et al*., (2020) found that inadequate meat inspection and low awareness among meat handlers significantly increase the risk of spreading such infections to consumers.

Finally, 30 out of the 50 cattle examined (60%) were free of *Taenia*, but not necessarily free of other parasites. This suggests that while *Taenia* Spp. are a significant concern, other gastrointestinal parasites are even more widespread in the study area. Therefore, any control measures must target not

only *Taenia* but also broader parasitic threats in the region. This study reveals that *Taenia* Spp. infections remain a public health risk among cattle slaughtered in Oye LGA, particularly due to their involvement in multiple parasitic co-infections. The absence of single-species *Taenia* infections indicates an environment heavily burdened by overlapping parasite transmission routes. Immediate steps such as improved abattoir hygiene, regular deworming, effective meat inspection, and community education are essential to break the cycle of transmission and safeguard both animal productivity and public health.

CONCLUSION

In conclusion, the presence of *Taenia saginata* infection in Oye LGA's slaughtered cattle indicates the presence of bovine cysticercosis. Inadequate meat inspection, poor hygiene, and environmental pollution all contribute to the illness, endangering public health and resulting in financial losses. People are more likely to consume contaminated meat since butchers and consumers are often unaware of the disease. This cycle is likely to persist in the absence of improved veterinarian monitoring and community education. Therefore, it is imperative that monitoring be stepped up, sanitation be improved, and all stakeholders be educated.

Enhance Meat Inspection and Veterinary Services: To ensure that all killed animals are properly inspected to identify and remove contaminated meat before it reaches the market, government and local authorities should increase the number of veterinary employees and provide training to all.

Boost Public awareness: Health and veterinary organizations ought to launch educational initiatives aimed at consumers, meat vendors, and butchers. The dangers of consuming undercooked beef, how to identify contaminated meat, and fundamental hygiene techniques to disrupt the parasite's life cycle should all be covered in these programs.

Improve Sanitation and Environmental Hygiene: By lowering open defecation and enhancing waste management, local governments may encourage improved sanitation. Taenia eggs will be less likely to contaminate grazing areas and water sources in cleaner settings.

Encourage the One Health Approach: To develop integrated control strategies, cooperation between the environmental, animal, and human health sectors should be promoted. This covers coordinated community and regional actions, data sharing, and cooperative surveillance.

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