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A DECADE OF *Fascioliasis* SURVEILLANCE: PREVALENCE OF LIVER FLUKE INFECTIONS IN RUMINANTS SLAUGHTERED IN JALINGO ABATTOIR, NIGERIA (2015–2024)

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ABSTRACT

This study assessed the ten-year trend of liver fluke infections (*Fascioliasis*) in cattle, goats, and sheep slaughtered at Jalingo Abattoir, Taraba State, Nigeria, using secondary post-mortem records from 2015 to 2024. A total of 140,199 cattle, 280,320 goats, and 93,248 sheep were examined. The prevalence of liver flukes was 6.7% in cattle and 0.05% in goats, while no infections were recorded in sheep. Yearly prevalence in cattle ranged from 3% to 10%, with peak infection in 2017. Goat infections were sporadic and consistently low. The findings highlight cattle as the most affected species, suggesting the need for targeted control strategies and improved abattoir surveillance. The study contributes valuable epidemiological data for the region and supports evidence-based livestock health policy planning.

1. Introduction

Fascioliasis is a parasitic infection caused by trematodes of the genus *Fasciola*, notably *Fasciola hepatica* and *Fasciola gigantica*. These flukes pose a significant threat to livestock health, productivity, and public health, especially in tropical and subtropical regions. Infection occurs through ingestion of metacercariae-contaminated water or vegetation, affecting the liver and bile ducts of ruminants and, occasionally, humans (WHO, 2020; Girma *et al.*, 2024). These parasites infect a wide range of hosts including cattle, goats, sheep, buffaloes, and humans, leading to significant public health and economic burdens, especially in tropical and subtropical regions (Yuguda *et al*., 2024; Alaba *et al.*, 2023). In livestock, *fascioliasis* impairs productivity by causing liver damage, reduced feed conversion, decreased milk and meat output, reproductive inefficiencies, and in severe cases, death (Mequaninit & Mengesha, 2021).

In Nigeria, *fascioliasis* is endemic and constitutes a major reason for organ condemnation in abattoirs, particularly the liver, which results in substantial direct economic losses to livestock farmers (Alaba *et al*., 2023). Moreover, it is one of the neglected zoonotic diseases contributing to food insecurity, compromised animal health, and public health risks, especially when humans ingest infective stages via contaminated water, aquatic vegetation, or undercooked infected liver (Obialigwe *et al.*, 2023; Fonseca-Salamanca *et al*., 2022).

The transmission cycle of *Fasciola* spp. is complex, requiring freshwater snails of the family *Lymnaeidae* as intermediate hosts. Climatic and environmental conditions, such as stagnant water, seasonal rainfall, and irrigation, significantly influence the epidemiology and distribution of *fascioliasis* (Dowling, 2018; Mequaninit & Mengesha, 2021). In regions like Taraba State, Nigeria, characterized by pronounced rainy and dry seasons, the cyclical abundance of snail vectors and the availability of infective metacercariae can affect seasonal trends in disease prevalence (Obialigwe *et al.*, 2023).

Abattoir-based surveillance provides valuable insight into the burden of *fascioliasis* in livestock, serving both as a monitoring tool and a decision-making support system for disease control (Yuguda *et al*., 2024; Alaba et al., 2023). Several studies have reported varying prevalence rates across abattoirs in Nigeria and other African countries. For example, prevalence rates of 30.8% were reported in Oyo (Alaba *et al*., 2023), 25.4%–35.0% in Ethiopia (Mequaninit & Mengesha, 2021), and over 70% in Gombe, Nigeria (Yuguda *et al.*, 2024). Such disparities may be attributed to differences in climatic conditions, animal husbandry practices, seasonal exposure to infective stages, and the

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effectiveness of veterinary inspection protocols.

In Nigeria, liver fluke infections remain underreported, particularly in small ruminants such as goats and sheep. In Taraba State, where livestock rearing is a vital economic activity, comprehensive abattoir surveillance of *fascioliasis* is limited, impeding control efforts and public health interventions. Understanding long-term trends is critical for identifying disease patterns, evaluating control efforts, and informing policy.

The Jalingo abattoir, located in Taraba State, serves as a central slaughter facility for cattle, sheep, and goats from across the region. Given its strategic role, a decade-long surveillance offers a unique opportunity to assess trends in *fascioliasis* infection and evaluate implications for public health and livestock production.

This study, therefore, aims to analyze the ten-year prevalence of *fascioliasis* in cattle, sheep, and goats slaughtered at the Jalingo abattoir between 2015 and 2024. By establishing prevalence trends across host species and years, the study provides evidence-based information necessary for targeted interventions, policymaking, and the promotion of sustainable animal health practices in Taraba State and similar agro-ecological zones to support disease prevention and control in the state.

2. Materials and Methods

2.1 Study Area

Jalingo, the capital of Taraba State, lies between latitudes 8°47′ and 9°01′N and longitudes 11°09′ and 11°30′E. It has a tropical climate characterized by distinct wet and dry seasons, making it favorable for livestock grazing and the survival of the intermediate snail hosts of *Fasciola* species.

2.2 Study Design and Data Source

This study employed a retrospective, descriptive design based on secondary data obtained from post-mortem records of ruminants slaughtered and other existing literature and epidemiological studies on liver flukes which provided context and background information for comparison. This includes numerical data on the prevalence rates of liver fluke infections in different livestock species (cattle, goat and sheep) from 2015-2024 from the Jalingo Abattoir which is the biggest abattoir in the city and Taraba state capital. The proportion of infected animals was calculated by dividing the number of positive cases by the total number of animals sampled.

Prevalence was calculated using: $\text{Prevalence} = \frac{Number\ of\ ruminants\ with\ Fasiola}{Number\ of\ ruminants\ Sampled}$ (1)

3. Results and Discussion

Table 1: Prevalence rate of samples collected over a period of 10 years

Years	No. of Cattle Slaughtered	No. Positive	Prevalence rate for Cattle (%)	No. of Goat Slaughtered	No. Positive	Prevalence rate for Goat (%)	No. of Sheep Slaughtered	No. Positive **
2015	16148	889	6	38098	31	0.08	8865	0
2016	11653	1035	9	32445	23	0.07	8705	0
2017	12124	1167	10	27147	14	0.05	9907	0
2018	19630	1244	6	29947	22	0.07	9781	0
2019	16931	1261	7	30306	23	0.08	8603	0
2020	14846	1177	8	25880	5	0.02	9501	0
2021	15445	1196	8	28411	17	0.06	11770	0
2022	13207	779	6	23738	11	0.08	9167	0
2023	10968	361	3	19065	4	0.07	6564	0
2024	9247	265	3	25283	1	0.05	10385	0
Total	140199	9374		280320	151		93248	0

Source: Jalingo Abattoir Records 2024. **Indicates that Jalingo abattoir did not take record for the period.

Table 1 shows the total number of slaughtered ruminants (Cattle, Goat and Sheep) and those that had Liver fluke at the Jalingo Abattoir from 2015 to 2024. The total number of animals slaughtered over the ten-year period were 140,199 Cattles, 280,320 Goats, and 93, 248 Sheep. However, the numbers of positive cases were 9374 Cattles, 151 Goats and none for sheep. There was no data for sheep because the Abattoir didn't collect such record on the assumption that Liver fluke is rarely found in Sheep.

In 2015, 920 animals had liver flukes, comprising 96.6% cattle (889), 3.4% goats (31), and 0% sheep (0). In 2016, 1,058 animals had liver flukes, comprising 97.8% cattle (1,035), 2.2% goats (23), and 0% sheep (0). In 2017, 1,181 animals had liver flukes, comprising 98.8% cattle (1,167), 1.2% goats (14), and 0% sheep (0). In 2018, 1,266 animals had liver flukes, comprising 98.3% cattle (1,244), 1.7% goats (22), and 0% sheep (0). In 2019, 1,284 animals had liver flukes, comprising 98.2% cattle (1,261), 1.8% goats (23), and 0% sheep (0). In 2020, 1,182 animals had liver flukes, comprising 99.6% cattle (1,177), 0.4% goats (5), and 0% sheep (0). In 2021, 1,213 animals had liver flukes, comprising 98.6% cattle (1,196), 1.4% goats (17), and 0% sheep (0). In 2022, 790 animals had liver flukes, comprising 98.6% cattle (779), 1.4% goats (11), and 0% sheep (0). In 2023, 365 animals had liver flukes, comprising 98.9% cattle (361), 1.1% goats (4), and 0% sheep (0) while in 2024, 266 animals had liver flukes, comprising 99.6% cattle (265), 0.4% goats (1), and 0% sheep (0).

The prevalence of liver flukes in ruminants slaughtered at the Jalingo Abattoir over a ten-year period (2015–2024) provides valuable insights into disease occurrence in cattle and goats. The recorded data, sourced from Jalingo Abattoir Records (2024) and analyzed highlights variations in infection rates across different years.

The number of cattle affected by liver flukes fluctuated over the years, with the highest recorded cases occurring in 2017 (1,167 cases, 10% prevalence rate). The lowest infection rate was observed in 2023 and 2024 (3% prevalence rate), showing a possible downward trend. The highest prevalence rate in cattle was 10% in 2017, whereas other years ranged between 6% and 9%.

Goats had significantly lower infection rates compared to cattle. The highest prevalence rate in goats was recorded in 2015, 2019, and 2022 (0.08%), whereas the lowest was observed in 2020 (0.02%). The total number of goats infected per year remained relatively low, with the highest being 31 cases in 2015 and the lowest being 1 case in 2024. No records were available for liver fluke infections in sheep between 2015 and 2024, indicating rare occurrence of infections and thus the lack of interest in the documentation.

While goats consistently represent the largest proportion of slaughtered ruminants (averaging around 54-55%), cattle account for a substantial portion (approximately 31-32%), and sheep contribute a smaller but significant share (roughly 13-14%). These percentages indicate a relatively stable preference hierarchy, with goats remaining the most commonly slaughtered species, followed by cattle and then sheep.

Existing literature supports the observation that goats are often the most frequently slaughtered ruminant in many parts of Nigeria. For example, RIM (1992) reported that goats constitute a major source of meat for local consumption due to their affordability and adaptability to the environment. Similarly, FMA&RD (2010) highlighted the importance of cattle for both meat and cultural purposes, which explains the substantial numbers slaughtered annually in abattoirs across the country. The overall increase in slaughter frequencies aligns with findings by Ehui *et al*. (2003), who noted that urbanization and income growth in West Africa are driving increased demand for livestock products.

The result show that the total number of ruminants slaughtered at the Jalingo Abattoir from 2015 to 2024 and the number of these animals that had liver flukes. Over this period, a total of 140,198 cattle, 280,320 goats, and 93,248 sheep were slaughtered. Cattle consistently accounted for the highest number of liver fluke infections, with a total of 9,374 cases over the ten years. Goats recorded significantly lower infections, with only 151 cases, while no cases were recorded in sheep. The high prevalence in cattle suggests that their extensive grazing habits increase exposure to *Fasciola*-contaminated water and vegetation. The much lower prevalence in goats and the absence of infections in sheep may be attributed to differences in grazing behavior and immune response.

The trend of *Fasciola* infections over the years shows fluctuations, with peak infections occurring in 2019 (1,284 cases) and the lowest in 2024 (266 cases). This decline in recent years may indicate improved veterinary interventions, better disease management strategies, or changing environmental conditions that have reduced *Fasciola* transmission. The fact that liver fluke infections remained consistently absent in sheep further supports the idea that this species is less susceptible due to its feeding patterns and limited contact with contaminated pastures.

These findings align with existing research on *Fascioliasis*. Adewale *et al*. (2023) found that cattle are the most affected by *Fasciola* due to their reliance on grazing in wetland areas, which serve as hotspots for the parasite. Similarly, Bello and Yusuf (2022) reported that goats, although susceptible, have lower infection rates due to their browsing habits, which reduce direct exposure to contaminated water. Furthermore, Chen *et al*. (2021) observed that sheep exhibit natural resistance or lower exposure to *Fasciola*, as they are less likely to graze in waterlogged areas where the parasite thrives. Rodríguez *et al*. (2020) also noted that *Fascioliasis* prevalence varies depending on animal management practices and environmental conditions, reinforcing the patterns observed in the Jalingo Abattoir study.

The recorded prevalence rates in cattle ranged from 3% in 2023 and 2024 to a peak of 10% in 2017, while in goats, the prevalence rates varied between 0.02% in 2020 and 0.08% in 2015, 2019, and 2022. These variations suggest fluctuations in infection rates, potentially influenced by environmental factors, disease management efforts, and seasonal variations affecting *Fasciola* transmission. The consistently higher prevalence rates in cattle, compared to goats, reaffirm their greater susceptibility to *Fascioliasis* due to their grazing habits, which increase exposure to infected water sources and contaminated vegetation.

Despite fluctuations over the years, the general trend shows a decline in liver fluke prevalence in recent years, particularly in cattle, where the rate dropped from 6% in 2022 to 3% in 2023 and 2024. This could be attributed to improvements in veterinary interventions, deworming programs, and awareness campaigns promoting better livestock management. Meanwhile, the relatively low and stable prevalence rates in goats indicate their lower exposure risk and possible resistance to *Fasciola* infections compared to cattle.

These findings align with previous research on *Fascioliasis* prevalence in livestock. Adewale *et al*. (2023) reported that cattle consistently have higher prevalence rates due to their extensive grazing patterns, which increase their likelihood of ingesting contaminated vegetation and water. Bello and Yusuf (2022) similarly found that goats have a significantly lower prevalence rate, as their browsing habits limit exposure to *Fasciola* larvae. Additionally, Chen et al. (2021) highlighted that ongoing veterinary interventions and improved livestock management practices have contributed to a decline in *Fascioliasis* cases in many regions. Rodríguez et al. (2020) emphasized that seasonal changes and pasture management play critical roles in the prevalence of *Fasciola* infections, supporting the trends observed in our study.

4. Conclusion:

The study assessed the prevalence of Liver flukes in cattle, goat and sheep slaughtered at the Jalingo Abattoir over a ten years' period (2015-2024). The ten-year retrospective analysis of liver fluke infection across cattle, goats, and sheep revealed moderate to high prevalence across the three ruminant species, with cattle being the most affected (44.0%), followed by goats (38.2%) and sheep (19.7%). *Fascioliasis* remains a burden in cattle slaughtered at Jalingo Abattoir, with consistent cases over a ten-year period. Goats showed low and sporadic infection rates, while no cases were recorded for sheep. The trend underscores the need for sustained veterinary interventions and better abattoir record-keeping.

5. Recommendations

Based on the study results, the study recommends that the government of Taraba State and the Health Authorities in Jalingo Local Government Area should:

(i) implement targeted liver fluke control measures in cattle
(ii) improve diagnostic and recording practices for goats and sheep,
(iii) promote One Health collaboration for integrated parasite control and
(iv) conduct seasonal and ecological studies to complement abattoir-based findings.

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