



PREVALENCE, KNOWLEDGE AND ATTITUDE OF BUTCHERS TOWARDS FASCIOLIASIS PARASITE AT SELECTED ABATTOIRS IN ABEOKUTA METROPOLIS, OGUN STATE, NIGERIA

^{*1}Adeleke, G. A., ¹Olaleye, O. O., ¹Folorunsho, A. O. and ²Ologbon, O. A. C.

¹Department of Animal Production, Faculty of Agricultural Production and Renewable Resources,
College of Agricultural Sciences, Olabisi Onabanjo University, Ayetoro Campus, Ogun State

²Department of Cooperatives and Rural Development,
Faculty of Administration and Management Sciences,

Olabisi Onabanjo University, Ayetoro Campus, Ogun State,

***Correspondent Author's Email:** ologbon.christopher@oouagoiwoye.edu.ng

ABSTRACT

The study investigated the prevalence, knowledge and attitude of butchers towards Fascioliasis parasite at selected abattoir in Abeokuta, Ogun State. A purposive sampling procedure was employed, collecting data with structured questionnaire and key informant interview; which were descriptively analyzed. From the study, 86.09% of the respondents were male; aged 25 to 30 years, practiced Islamic religion; married (72.17%); had primary education; and had between 5 and 10 household members. Only 11% of them had post-primary school education, but with 11 to 20 years' experience as abattoir operators. 45% of the butchers viewed fascioliasis as belonging to the class of zoonotic helminthes. Most butchers admitted the parasite primarily infects the liver, causing enlargement (40%), color changes (28%), and liver lesions (10%). All the butchers had pre-knowledge of Fascioliasis as a common parasite, stating its attendant effects as including weight loss (60%) and loss of appetite (20%). The study revealed butchers' pre-knowledge of Fascioliasis prevalence in the study area, propelling them to undergo various handling and safety trainings regarding meat dressing/processing. 70.43% of the butchers had not recorded any incidence of Fascioliasis infection, despite their relatively long abattoir operation experiences. All the respondents believed that Fascioliasis causes revenue loss. Common mitigating practices against Fascioliasis' spread in the study area include effective cattle deworming; routine meat inspection, and enforcement of relevant government policies by the inspectorate health professionals. The study concludes that Fascioliasis is a well-known parasite among butchers/operators of abattoirs in Abeokuta metropolis, causing economic loss through reduction in sellable animal parts, thus, leading to reduced income. Routine inspection on meat stocks by health workers is impactful, mitigating economic losses to butchers. The study recommended sustainable control programs for Fascioliasis, including public awareness about the economic importance of the parasite; and educating butchers and meat vendors on government sustainable abattoir operation policies.

Keywords: Fascioliasis, Prevalence, Knowledge, Attitude, Butchers, Abattoir

INTRODUCTION

In Nigeria, cattle are among the most prominently domesticated livestock. They always serve as valuable assets in the agricultural sector since they provide animal protein, milk, employment, hide, and skin for leather production and beef during festive seasons (Yahaya *et al.*, 2014). Nigeria is the largest livestock producer in sub-Saharan Africa, with a population of about 17 million cattle, and a larger number of this population is concentrated in the northern region of the country (WHO, 2007). The worth of Nigeria's livestock is estimated at USD 6 billion (Akande *et al.*, 2010) and they contribute greatly to the agricultural component of the gross domestic product (GDP) of which cattle production makes up to 40% (Obi *et al.*, 2020). However, despite the high population of cattle in Nigeria, the quantity of meat obtained is far below the national demand due to many causes, including parasitic infections (Abubakar *et al.*, 2020). As a result of this insufficiency, most of the cattle are imported from neighboring African countries to meet the meat demand in major cities in Nigeria



(Walker *et al.*, 2008). Parasitic infections pose a serious health threat to living organisms (Mansur *et al.*, 2020), especially gastrointestinal helminths parasites, which affect ruminants, thereby affecting their productive performance (Obi *et al.*, 2020). Fascioliasis is an important parasitic helminth of farm animals in tropical and sub-tropical countries which inhibits the productivity of ruminants in particular cattle (Keyyu *et al.*, 2005). This may be due to the fact that the area has suitable ecological condition to the existence and multiplication of the intermediate host snail (*L. truncatula*). It is known globally to be important helminthic parasite of ruminants caused by liver fluke species of the genus *Fasciola* and it is one of the most neglected tropical helminths parasites (World Health Organization, 2009). It has the widest geographic spread of any emerging parasite, and it occurs in many countries of the world (Mas-Coma *et al.*, 2009). Bovine Fascioliasis is a parasitic helminth of cattle usually spread by *Fasciola gigantica* and rarely *Fasciola hepatica* in the tropics (Walker *et al.*, 2008). These two *fascioli* species often overlap in many African and Asian countries and sometimes in the same country, although in such cases the ecological requirements of the flukes and their snail intermediate host are distinct (Mohammed, 2015). Fascioliasis is enzootic in Nigeria and is of great economic importance especially in northern Nigeria where stagnant water and ponds are used as watering and grazing sites in the dry season (Ejeh *et al.*, 2015). The economic losses due to this disease in most parts of Sub-Saharan Africa is difficult to quantify because most of the livestock farmers are nomadic pastoralists who constantly shift from one area to another according to the prevailing climatic conditions and in search of water and grazing fields making the control of the parasite difficult. The parasite is transmissible from animal to human by human consumption of infected animal liver and from human to human through the faecal oral route. Animal get infected by consumption of infected feed, water and pasture (Magaji *et al.*, 2014).

Moreover, the prevalence of Fascioliasis in cattle has been reported from different parts of Nigeria. There are also several reports on the prevalence and seasonal variation for fascioliasis in cattle. Biu *et al.* (2006) reported a prevalence of 8.42% that occurred in Maiduguri from slaughtered cattle while Aliyu *et al.* (2014) also reported a prevalence of 17.1%, from Zaria. In Ibadan, Adedipe *et al.* (2014) reported 36.2% prevalence whereas Oladele-Bukola and Odetokun (2014) reported 2.31% using 11 year retrospective study. Kuchai *et al.* (2011) carried out a cross-sectional study in Sokoto and reported a prevalence of 27.68%. In Yola, Adamawa State, Ardo *et al.* (2013) reported a prevalence rate of 21.5%, and Uduak (2014) reported a prevalence of 1.72% in Port-Harcourt. Ejeh *et al.* (2015) conducted a 5-year retrospective study and reported prevalence of 14.56% in Makurdi, Benue State. In 2016, a cross-sectional study conducted in Edu Local Government Area, Kwara State using faecal samples reported a prevalence of 74.9% (Elelu *et al.*, 2016). With these myriads of findings on the spread of this parasite and its attendant disease across Nigeria, the question then is, are butchers in abattoirs in Abeokuta metropolitan area aware of the existence, virulence and economic importance of this parasite? It was in search for relevant answers to these questions and some other related ones that this study was thus conceptualized. This study had examined the extent of butchers' awareness, knowledge, attitude and perceptions about *Fasciola* parasite; as well as ascertaining the mitigating measures taken by butchers to curb the spread of the parasite in the study area.

METHODOLOGY

The Study Area

The study was conducted in selected abattoirs in Abeokuta, the Ogun State capital. The Abeokuta metropolitan geographical entity used as the study area stretches across the two major Local Government Areas (L.G.As) under Abeokuta Central, and two other adjoining L.G.As, namely Odeda L.G.A and Obafemi/Owode L.G.A. Abeokuta borders major gateway settlements in the Northern part of it, including major cattle rearing settlements like Igbo-Ora (Oyo State), Olodo and Kara (in Imeko/Afon axis of the state). Abeokuta metropolis, being the seat of Ogun State Government, is home to several public sector employees of State, Federal and private organisations. Despite being an economic hub and a commercial city profound for its textile fabrics (Aso-Oke), it is however surrounded by agrarian communities at its suburb, from where agricultural commodities are brought to major foodstuff markets in the city.



The metropolitan area population of Abeokuta in 2022 was 557,000, a 2.39% increase from 2021 population figure. The selected abattoirs covered in the study therefore were Lafenwa and Rounder Abattoirs (Abeokuta North); Car Wash Abattoir (Abeokuta South); Adigbe Abattoir (Obafemi/Owode); and Gbonogun Abattoir (Odeda). These abattoirs were purposively selected because of their prominence, large sizes, and large patronage due to the enormous daily cattle and goat slaughtering activities. The popularity and strategic location of the selected abattoirs enable large number of butchers and customers patronage, making the volume of daily traded meat stock to be substantial. Butchers at these abattoirs make use of minimal personal protective equipment (PPE) and bare hands while dressing carcasses and processing offal (intestinal organs). Many of the butchers are also known with the attitude of consuming raw (uncooked) meat portions during slaughtering and dressing on the slaughter slab in the abattoir.

Sampling technique and Sample Size

Purposive sampling procedure was employed to select one hundred and twenty (120) butchers from the selected major abattoirs in the study area. The sample size was Lafenwa Abattoir (48); Rounder Abattoirs (12); Car Wash Abattoir (18); Adigbe Abattoir (20); and Gbonogun Abattoir (22). The butchers were identified through a snow-bailing exercise that spans through strategic locations within the Abeokuta metropolis.

Method of Data Collection

The questionnaire was prepared in mixed languages (local and English languages) and administered through one-on-one contact interview with butchers and selected abattoir operators that served as key informants. The questionnaire were developed based on the information gathered through a pilot survey that was conducted prior to the main study, spiced up with key variables of concern obtained from literature; and on the basis of established attitude and perception of butchers in the study area. The questionnaire focuses on assessing the level of knowledge, attitude, perception and measures put in place to curb the spread of *Fascioliasis*. Assessment of butchers' level of awareness was based on self-reported bio-data (demographic features); established knowledge of the business environment (zoonotic nature and symptoms of *Fascioliasis*); butchers' attitude (vaccination status of abattoir worker); and habitual practices (including attitudinal treatment of affected part of the carcasses).

The questionnaire was considered valid for analysis by scores generated on a scale of "0-4" measurements, following the methodology adopted by Waller *et al.* (2004). Only persons that showed understanding and willingness to participate in the study were included in the sample.

Methods of Data Analysis

Five questionnaires with spurious, incomplete or controversial information were discarded while only One Hundred and Fifteen (115) questionnaires with adequate information were analysed for the purpose of achieving the study objectives. Data generated from the survey were analysed through SPSS for descriptive features, such as percentage and frequency distribution, to elicit/describe the socioeconomic characteristics of butchers; their level of awareness, attitude, perception; and the quality control measures adopted against *Fascioliasis* in the selected abattoirs.

RESULTS AND DISCUSSION

Demographic Information of Butchers in the Study Area

The results obtained for the demographic information of butchers in the study area is presented in Table 1. The results revealed that majority (52.17%) of the butchers were aged between 30 - 60 years; mostly male (86.06%); married (72.17%); mostly polygamous (81.74%) by the type of the marriage setting they practiced; and majority of them (62.61%) having a household size between 5 to 10 members. While a larger percentage of the butchers (82.60%) had at their best, been formally educated up to primary school level, only 17.39% of them had managed to acquire secondary/post-secondary education. Most (91%) of the butchers depended only upon meat slaughtering and selling as their only primary occupation, having mostly stayed on the abattoir job for an average of 16 years of on-the-job experience.



Majority of butchers in the study area being married and polygamous confirms the findings of Uzokwe and Bakare (2013) who observed that majority of butchers at community-level abattoirs would normally be confronted with the challenge of having to cope with large family sizes, though with majority of them usually with meagre but daily net income. Although, most of the butchers have no formal education, yet a good number of them reported having knowledge of prevention of Fascioliasis. This they demonstrated good practice towards Fascioliasis prevention as a result of earlier awareness created by extensionists, veterinarians, and visiting public health workers from government establishments within their vicinity.

Table 1: Demographic Information of Butchers in Abeokuta Metropolis (n = 115)

Variables		Frequency	Percentage
Age	30 years and below	34	29.55
	30-60	60	52.17
	> 60 years	21	18.26
	<i>Total</i>	<i>115</i>	<i>100.00</i>
Sex	Male	99	86.09
	Female	16	13.91
Total		<i>115</i>	<i>100.00</i>
Religion	Monogamous	21	18.26
	Polygamous	94	81.74
Total		<i>115</i>	<i>100.00</i>
Marital Status	Single	21	18.36
	Married	83	72.17
	Widow/Widower	6	2.22
	Separated	5	4.35
Total		<i>115</i>	<i>100.00</i>
Educational Level	No formal education	36	31.30
	Primary education	59	51.30
	Secondary Education	16	13.91
	Tertiary Education	4	3.48
Total		<i>115</i>	<i>100.00</i>
Household Size	< 5	41	35.65
	5-10	72	62.61
	> 10	2	1.74
Total		<i>115</i>	<i>100.00</i>
Main Occupation	Slaughter/Meat selling	105	91
	Non-Abattoir related jobs	10	9
Total		<i>115</i>	<i>100.00</i>
Years of Experience	10 years and below	14	12.17
	11-20	62	53.91
	> 20	39	33.91
Total		<i>115</i>	<i>100.00</i>

Source: Field Survey, 2022

Prevalence of Fasciola Parasite on Slaughtered Cattle

The study reported on the prevalence of Fascioliasis on slaughtered cattle as presented in Table 2. Majority of the butchers (45%) knew that the major cause of Fascioliasis is via helminthes. Some butchers (29%) have no idea about the casual of the disease while fewer respondents (26%) believed that protozoa or bacteria are the causal agent of the disease. About (67%) of the respondents knew that the Fascioliasis disease can be transmitted among humans with majority (65%) of them revealed that the major organ affected is the liver. There was no general consensus among the butchers about the likelihood of the parasite being transmitted from animal to human. Whereas, signs of the affected liver displayed larger than normal size (40%), change colour (28%), have lesion on the liver (10%) while 22% have no idea about the signs of the affected liver.



Organ changes colour becoming protruded and larger than normal size; and visible lesions on the affected organ... (Key Informant report about the fate of the internal organ(s) of slaughtered cattle often affected by Fascioliasis sp.)

The parasite is readily visible and easily recognized by unaided eye... (Key Informant report about the possibility of identifying affected internal organ(s) of slaughtered cattle by unaided eye)
Liver and Heart of cattle are the organs often affected by the Fasciola parasite... (Key Informant report about the internal organ(s) of slaughtered cattle often affected by Fascioliasis sp.)

The above results were corroborated by the reports of WHO (2007) and Yusuf *et al.* (2016) that one of the most important parasitic liver diseases in ruminants is considered to be Fascioliasis which is sometimes called liver fluke disease, liver rot or hepatic chistomiasis. The disease affects farm livestock, mostly cattle and sheep.

There was no previous knowledge how affected animal organs are treated... (Key Informant report about previous knowledge prior to the enlightenment and awareness created by this study).
Affected organs are usually separated and burnt under the supervision of local health workers, though a substantial fraction of the respondents do not totally agree to non-consumption claims of such organs by the health worker under the claim that the harmful nature of the parasite becomes eroded by mere boiling/cooking... (Key Informant report about previous knowledge of how affected slaughtered parts are treated prior to the enlightenment and awareness created by this study).

Parasitic infections pose a serious health threat to living organisms (Mansur *et al.*, 2020), especially gastrointestinal helminths parasites, which affect ruminants, thereby affecting their productive performance (Obi *et al.*, 2020). Gastrointestinal helminths are the ubiquitous parasitic agent that affects livestock, more especially cattle, limiting their production capacities such as reduced meat and milk production.

Table 2: Prevalence of Fascioliasis spp. on Slaughtered Cattle (n = 115)

Variables	Frequency	Percentage (%)
Preliminary knowledge about the prevalence of Fascioliasis in local abattoirs prior to the study		
Yes	88	76.52
No	27	23.48
Total	115	100.00
Previous knowledge about Fasciola parasite affecting only internal organ(s) prior to the study		
Yes	93	80.87
No	22	19.13
Total	115	100.00
Ability to identify the parasite within the visceral (internal) organ in slaughtered cattle prior to the study		
Yes	91	79.13
No	24	20.87
Total	115	100.00
Previous knowledge about the fate of the affected organ prior to the study		
Yes	73	63.48
No	42	36.52
Total	115	100.00
Concurrence with the fact that affected organs are not safe for consumption prior to the study		
Agreed to the fact	69	60.00
Disagreed with the fact	46	40.00
Awareness of the zoonotic nature of the parasite prior to the study		
Yes	75	67.0
No	40	33.0
Total	115	100.00

Source: Field Survey, 2022

Knowledge Level of the Human Health Implication of FASCIOLIASIS among the butchers

The knowledge level about *Fasciola* parasite among butchers is presented in Table 3. From the findings, all of the sampled butchers reported that they were familiar with Fascioliasis, and majority (80%) of them acknowledged the fact that Fascioliasis was of major health concern in the study area.

...Fascioliasis is a known parasite among abattoirs in the study area, but the activities of local health workers are helping to curb its economic effects... (Key informant response about butchers' previous knowledge about Fascioliasis sp. in the study area)

Majority of the butchers knew the signs and symptoms of Fascioliasis as including weight loss (60%), decreased of appetite (20%), rough hair coat (20%), while some believed that the signs that comes with the parasite infestation are weight loss (48%), Nausea (24%), vomiting (15%) and Fever (13%). About (62%) of the respondents has no idea whether *Fasciola* parasite could be transmitted from cattle to humans. This could have been possible with the help of various information agencies, mass or social media, and through participation in public health talks, seminars and workshops organized for similar purpose. This findings is supported by that of Magaji *et al.* (2014) and Musa *et al.*, (2021) that investigated the prevalence of Fascioliasis in a rural community of Oyo State and reported that 60% of their respondents were aware of the economic and health implications of the parasite, and its transmission potentials from animal to human.



Table 3: Knowledge of *Fasciola* Parasite among Butchers (n = 115)

Variables	Frequency	Percentage
Previous knowledge of Fascioliasis infestation in cattle/livestock before interview time		
Yes	80	80.0
No	35	20.0
Total	115	100.00
Have you been infected/treated of Fasciola parasite before this time as a butcher?		
Yes	34	29.57
No	81	70.43
Total	115	100.00
Has anyone of your customers/relative been infected with Fasciolosis before now?		
Yes	39	33.91
No	76	60.09
Total	115	100.00
Observed symptoms of Fascioliasis infestation on an infected livestock		
Weight loss	65	60.0
Lack of appetite	25	20.0
Rough hair coat	25	20.0
Total	115	100.00
Respondents' perceived sign(s) of Fascioliasis infestation in human		
Fever	18	13.0
Weight loss	52	48.0
Vomiting	18	15.0
Nausea	27	24.0
Total	115	100.00
Previously observed Fascioliasis infestation on slaughtered cattle		
Yes	95	
No	20	
Total	115	100.00
Coming in contact with Fascioliasis spp. in slaughtered cattle before interview time		
Yes		
No		
Total	115	100.00
Respondent's opinion about the internal organ(s) affected by Fasciola parasite		
Liver	60	65.0
Heart	35	10.0
Not aware of the particular internal organ(s)	20	25.0
Total	115	100.00
Awareness about the status of Fascioliasis not being a disease or infection of cattle but an internal parasite in slaughtered cattle		
Yes	95	82.61
No	20	17.39
Total	115	100.00
Respondents' knowledge level if the parasite can also be transmitted to human		
Yes	75	67.0
No	40	33.0
Total	115	100.00
Knowledge about what happens to the affected organ		
Change colour	43	37.39



Larger than normal size	40	34.78
Have lesion on the liver	10	8.70
No adequate knowledge	22	19.13
<i>Total</i>	<i>115</i>	<i>100.00</i>
Process of Fasciola parasite detection on slaughtered cattle at the abattoir		
Often detected by the heath officials	45	39.13
Usually detected by the abattoir operator and then reported to the heath officials	70	60.87
<i>Total</i>	<i>115</i>	<i>100.00</i>
Fate of internal organ infested by Fasciola parasite in the hands of butchers		
Affected parts are often buried underground under the supervision of the heath officials	57	49.57
Affected parts are often burnt to ashes under the supervision of the heath officials	42	36.52
Affected parts are occasionally often discarded only when detected by the heath officials; otherwise, they are cleverly sold to unsuspecting customers	16	13.91
<i>Total</i>	<i>115</i>	<i>100.00</i>

Source: Field Survey, 2022

Respondents' Perception about the Economic Importance of Fascioliasis spp. among Butchers

Butchers in the visited abattoirs were asked to express their perception on the economic importance of Fasciola parasite. Analysis of their responses was presented on Table 4. According to the report, all (100%) of the butchers claimed that infestation of meat parts with the parasite causes monetary loss and reduction in slaughtered meat parts to them; while seventy-eight (about 68%) of the butchers linked the parasite to induced gastro intestinal infection among them, leading to healthcare expenses

Table 4: Perception of Butchers on the Economic Importance of *Fasciola* Parasite (n = 115)

Perceived economic importance of Fasciola parasite to butchers	Number of butchers who answered to the affirmative	Percentage of butchers who answered to the affirmative (%)
Reduction in money income to butcher	115 of respondents	100
Physical loss of butchered/slaughtered meat parts	115 of respondents	100
Causes induced infection to the butcher, leading to healthcare expenses	78 of respondents	67.83%

Source: Field Survey, 2022

Butchers' Attitude towards Fasciola Parasite in the Study Area

Table 5 presents the attitude of butchers toward mitigation strategies in the study area. Fifty-six (about 49%) of the respondents reported that routine cleanliness around the cattle ranches before cattle gets to the abattoir/slaughter slabs was more effective as a strategy to mitigating the virulence of Fasciola parasite in the study area; though fewer number of respondents was of the different opinions that routine cleanliness of abattoir/slaughter slabs (24.35%) and constant awareness creation and training on meat handling (26.97%) were more effective. Majority (about 8%) of the butchers agreed that routine inspections were helpful to Fasciola parasite mitigation, but the economic implications of the visits to the abattoir/slaughter slabs was mainly upon them, and was usually very burdensome. Generally, most of the butchers admitted that routine inspections by the veterinaries/health officials to



the cattle ranches would be more effective in preventing *Fasciola* parasite infestation than frequent inspections to the abattoir/slaughter slabs.

The study reported that most (24.35%) of the butchers allows veterinaries and other healthcare officials to carry out their routine meat inspection on their animals; out of these, 66% confirmed that they did this on a daily basis. The butchers posited that if their animals were condemned for having Fascioliasis, 59% agreed that they rather remove the infected part rather than disposing off the whole animal. Moreover, majority (64.35%) of the butchers agreed on early isolation as a means of limiting the spread of Fascioliasis while few was of the opinion that prompt reporting to veterinaries (13.04%) and avoidance of overcrowding (22.61%) will equally be of help. The results was corroborated by that of Shitaye *et al.* (2006) and Cadmus *et al.* (2008) that reported the usefulness of post-mortem meat inspection in detecting various disease in cattle and hence prevent its transmission to consumers through total condemnation of such infected organs or carcasses.

Table 5: Mitigation Attitude of Butchers towards *Fasciola* parasite prevalence (n = 115)

Most effective mitigation strategy against <i>Fasciola</i> parasite prevalence as perceived by butchers	Response	Frequency	Percentage
Constant awareness creation and training on meat handling		31 of 115 respondents	26.97
Routine cleanliness around abattoir/slaughter slabs		28 of 115 respondents	24.35
Routine cleanliness around the cattle ranches before cattle gets to the abattoir/slaughter slabs		56 of 115 respondents	48.70
Strategy against the spread of Fascioliasis in cattle ranches			
Early isolation of affected cattle from the flock		74 of 115 respondents	64.35
Avoidance of overcrowding at the cattle ranch		26 of 115 respondents	22.61
Prompt reporting cattle handlers to veterinaries		15 of 115 respondents	13.04

Source: Field Survey, 2022

Butchers' Opinion about the Routine Inspection Exercises by Veterinary/Health Officials at the Abattoir/Slaughter Slabs in the Study Area

The opinion of butchers about the routing inspection of health/veterinary officials to slaughter slabs in the study area revealed the following mindset, which definitely have an attendant effect on the effectiveness of this mitigation strategy to curb the spread of *Fasciola* parasite in the study area:

- Routine inspection to the abattoir/slaughter slabs is more burdensome on the butchers.
- Frequent inspection is good but more costly to the butchers
- Inspection visitations to the cattle ranches will be more effective in preventing the spread of *Fasciola* parasite than to the abattoir/slaughter slabs.

Butchers' Suggestion(s) for Effective Control/Mitigation of the Spread of *Fasciola* Parasite

The suggestion of the respondent butchers as to the most effective mitigation/control strategy against the spread of *Fasciola* parasite were as thus highlighted:

- Restricting cattle to intensive pasture ranges weeks before they are brought to the abattoir/slaughter slab.
- Routine deworming regimen for fattened cattle.
- Sustainable abattoir record-keeping programme to track cases of *Fasciola* infection across abattoirs/slaughter slabs for effective policy making
- Routine meat inspections and compensation programme for condemned cattle or their parts to reduce economic losses to the butcher



CONCLUSION AND RECOMMENDATION

This study confirmed that Fascioliasis is an important parasite entity causing considerable economic loss of revenue due to condemnation of affected liver and carcass weight reduction among butchers in selected abattoirs in Abeokuta metropolis, Ogun State. Effective control of this parasite has been proven to require improved management practices and routine healthcare handlings of slaughtered animals in public abattoirs, as well as proper knowledge of the existence, cause, effects and control/mitigation strategies by butchers to prevent the economic implications of the parasite's attack that often leads to gross domestic product (GDP) losses.

Given the reported prevalence of Fascioliasis in the metropolitan area of Abeokuta in Ogun State, an attendant parasitic control program in this region becomes justifiable. The study therefore recommends public education on the parasite, emphasizing the role of snails in the parasite's life cycle and the health risks for both animals and humans.

Since most butchers in the study area are formally non-literate, it is recommended that they require adequate hands-on training on the appropriate measures towards checkmating helminthes and its resultant disease transmission to the larger society.

Additionally, implementing artificial pasture lands (rangeland system), regular deworming schedules with effective drugs such as albendazole and praziquantel, thorough meat inspections alongside compensation for condemned animals or their parts by the government, and maintaining updated abattoir records of Fasciola infection across abattoirs/slaughter slabs for effective policy formulations were part of the mitigation strategies recommended to minimize butchers' losses to Fasciola parasite in the study area. Also, enforcing government policies on the condemnation and disposal of infected liver and educating butchers and meat sellers on the significance of government policies and dangers involved in consuming affected animal parts, as well as improper disposal of infected parts.

REFERENCES

- Abubakar I.A. (2007). Molecular Epidemiology of Human and Bovine Tuberculosis in the Federal Capital Territory and Kaduna State, Nigeria. Ph.D Thesis, Plymouth University, UK.
- Abubakar, B.M., Wabi, A.A., Gagman, H.A. and Mohammed, U.A. (2020). Prevalence of helminths parasites in vegetables sold in Jama'are Metropolis, Bauchi State, Nigeria. *Bima Journal of Science and Technology*, **3**(2): 40-47.
- Adedipe, O. D., Uwalaka, E. C., Akinseye, V. O., Adediran, O. A. and Cadmus, S. I. B. (2014). Gastrointestinal helminths in slaughtered cattle in Ibadan, *South-Western Nigeria. Journal of Veterinary Medicine*, **1**: 1-6.
- Akande, F.A., Takeet, M.I. and Makanju, O.A. (2010). Haemoparasites of cattle in Abeokuta, South West Nigeria. *Sci. World Journal*, **5**(4): 19-21.
- Aliyu, A. A., Ajogi, I. A., Ajanusi, O. J. and Reuben, R. C. (2014). Epidemiological studies of Fasciola gigantica in cattle in Zaria, Nigeria using coprology and serology. *Journal of Public Health and Epidemiology*, **6**(2): 85-91.
- Ardo, M. B. and Aliyara, Y. H. and Lawal, H. (2013). Prevalence of bovine Fascioliasis in major abattoirs of Adamawa State, Nigeria. *Bayero Journal of Pure Applied Science*, **6**(1): 12-16.
- Biu, A. A., Ahmed, M. I. and Mshelia, S. S. (2006). Economic assessment of losses due to parasitic diseases common at the Maiduguri abattoir, Nigeria. *African Science*, **7**(3): 143-145.
- Cadmus, S.I.B., H.K. Adesokan and A.E.J. Awosanya, (2008). Public Health Issues and Observations Made During Meat Inspection at Bodija Municipal Abattoir, Ibadan, Oyo State, Nigeria. *Nigeria Veterinary Journal*, **29**(2): 43-47.
- Ejeh, E. F., Paul, B. T., Lawan, F. A., Lawal, J. R., Ejeh, S. and Hambali, U. I. (2015). Seasonal prevalence of bovine Fascioliasis and its direct economic losses due to liver condemnation at Makurdi Abattoirs north central Nigeria. *Sokoto Journal of Veterinary Science*, **13**(2): 42-48.
- Elelu, N., Ambali, A. G., Cole, G. C. and Eisler, M. C. (2016). Cross-sectional study of Fasciola gigantica and other trematode infections of cattle in Edu Local Government Area, Kwara State, north-central Nigeria. *Parasites and Vectors*, **9**: 470-480.



- Genc, Y. (2010). The Perception of Patients about Tuberculosis Disease in Terms of the Society and Psycho-Social Status. *Middle-East Journal of Scientific Research*, **5**(4): 283-290.
- Keyyu, J. D., Monrad, J., Kyvsgaard, N. C. and Kassuku, A. A. (2005). Epidemiology of *Fasciola gigantica* and amphistomes in cattle on traditional, small-scale dairy and large scale dairy farms in the southern highlands of Tanzania. *Tropical Animal Health and Production*, **37**: 303-314.
- Kuchai, J. A., Chishti, M. Z., Zaki, M. M., Muzaffar, D., Rasool, S. A., Ahmad, J. and Tak, H. (2011). Some epidemiological aspects of fascioliasis among cattle in Egypt. *Global Veterinarian*, **7**(4): 342-346.
- Magaji, A. A., Ibrahim, K., Salihu, M. D., Saulawa, M. A., Mohammed, A. A. and Musawa, A. I. (2014). Prevalence of Fascioliasis in Cattle Slaughtered in Sokoto Metropolitan Abattoir, Sokoto, Nigeria. *Advances in Epidemiology*, Article ID 247258, 5 pages <https://doi.org/10.1155/2014/247258>.
- Mansur, S., Abubakar, B.M., Hassan, I, Aliyu, U. (2020). Prevalence Of Soil-Transmitted Helminths Among Primary School Children in Yana, Bauchi State, Nigeria. *Bima Journal of Science and Technology*, **3**(2): 96-105.
- Mas-Coma, S., Valero, M. A. and Bargues, M. D. (2009). Fasciola, Lymnaeidae and Human Fascioliasis, with a Global Overview on Disease Transmission, Epidemiology, Evolutionary Genetics, Molecular Epidemiology and Control. *Advances in Parasitology*, **69**: 41-146.
- Mohammed, B. R. (2015). Impact of Fascioliasis on food security in Nigeria: A Review. *International Journal of Interdisciplinary Current Research*, **3**: 758-761.
- Musa U., Bashir, M., A., Haladu, A. G. and Abubakar, S. Y. (2021). The Occurrence of Gastrointestinal Helminths in Slaughtered Cattle in Azare, North-East Nigeria. *Journal of Zoological Research*. **3**(1): 1-8.
- Obi, C., Akata, M. and Ezubelu, O. (2020). Prevalence of gastrointestinal helminth parasites of trade cattle in Aguata and Orumba South Local Government Areas, Southeastern Nigeria. *Journal of Parasitic Diseases*; **44**(3): 546-552.
- Oladele-Bukola, M. and Odetokun, I. O. (2014). Prevalence of bovine Fascioliasis at the Ibadan Municipal Abattoir, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, **14**(4): 9055-9070.
- Rosiji, C., & Adesokan, H. (2012). Measures taken for bovine tuberculosis prevention among butchers in two major abattoirs in Ibadan, South-Western Nigeria. *Global Veterinaria*, **9**(1); 107-112.
- Shitaye, J.E., B. Getahun, T. Alemayehu, M. Skoric, F. Tremml, P. Fictum, V. Vrbas and I. Pavlik, (2006). A Prevalence Study of Bovine Tuberculosis by Using Abattoir Meat Inspection and Tuberculin Skin Testing Data, Histopathological and IS6110 PCR Examination of Tissues with Tuberculous Lesions in Cattle in Ethiopia. *Veterinari Medicina*, **51**: 512-522.
- Uduak, A. (2014). Incidence of Bovine Fasciolosis and its Economic Implications at Trans-Amadi Abattoir Port-Harcourt, Nigeria. 206-209. [10.5829/idosi.apg.5.3.85139](https://doi.org/10.5829/idosi.apg.5.3.85139).
- Uzokwe, U.N. and Bakare, E.A. (2013). The effects of climate variability on poultry production in Ose Local government area of Ondo State, Nigeria: Socio-economic characteristics and perceptions of farmers. *Int. J. Agric Biosci.*; **2**: 39-44.
- Walker, S. M., Makundi, A. E., Namuba, F. V., Kassuku, A. A., Keyyu, J., Hoey, E. M., Prodohl, P., Stothard, J. R. and Trudgett, A. (2008). The distribution of *Fasciola hepatica* and *Fasciola gigantica* within southern Tanzania – constraints associated with the intermediate host. *Parasitology*, **135**(4): 495-503.
- Waller J, McCaffery K, Wardle J. (2004). Measuring cancer knowledge: Comparing prompted and unprompted recall. *Br J Psychol.*, **95**: 219-34.
- World Health Organization (WHO), (2007). Report of the WHO Informal Meeting on use of triclabendazole in fascioliasis control,” Tech. Rep. WHO/CDS/NTD/PCT/2007.1.



- World Health Organization (WHO), (2009). Fascioliasis: infestation with the “neglected” neglected worms. Geneva: World Health Organization. [Online] Available at: http://www.who.int/neglected_diseases/integrated_media/integrated_media (Accessed on 24th April 2016).
- Yahaya, A. and Tyav, Y. (2014). A survey of gastrointestinal parasitic helminths of bovine slaughtered in abattoir, Wudil Local Government Area, Kano state, Nigeria. *Greener Journal of Biological Sciences*, 4(4): 128-134.
- Yusuf, M., Ibrahim, N., Tafese, W. and Deneke, Y. (2016). Prevalence of Bovine Fascioliasis in Municipal Abattoir of Haramaya, Ethiopia. *Food Science and Quality Management*; **48**: 1–7.