
ASSESSMENT OF ENDOPARASITIC INFECTION AND ITS PUBLIC HEALTH IMPACT AMONG CATTLE SLAUGHTERED AT KANO ABATTOIR, KANO STATE, NIGERIA

¹SHAFIU NAFIU ABDULLAHI, ²BADAMASI INUWA, ³MUKHTAR AMINU BALA AND ⁴ABUBAKAR HARUNA

^{1,2}Department of Life Sciences, Kano State Polytechnic, Kano- Nigeria

³Department of Science Laboratory Technology, Kano State Polytechnic

⁴Department of Science Laboratory Technology, Mai Idris Aloomaa Polytechnic, Geidam, Yobe, State

Correspondence author: nafiune.sn@gmail.com, 08064042006

ABSTRACT

Endoparasitic infections constitute a major constraint to livestock productivity and pose significant public health challenges in sub-Saharan Africa. The present study assessed the prevalence and public health implications of endoparasitic infections among cattle slaughtered at the Kano abattoir, Kano State, Nigeria. A cross-sectional study was conducted on 300 cattle using systematic random sampling. Faecal samples were examined for intestinal parasites using floatation and sedimentation techniques, while blood samples were screened for hemoparasites using thin blood smears. Data were analyzed using Chi-square tests and odds ratios at 95% confidence intervals. The overall prevalence of endoparasites was 40.9% (60/300). Intestinal parasites (23.3%) were more prevalent than blood parasites (16.1%). Female cattle showed significantly higher intestinal parasite prevalence (13.63%) compared to males (9.67%) ($p=0.032$). Age was significantly associated with infection, with older cattle (>1-4 years) showing higher prevalence (15.31%) than younger animals (7.69%) ($p=0.031$). Breed-specific analysis revealed the Sokoto Gudali breed had the highest prevalence (14.87%, $p=0.032$). *Cooperia* sp. was the most prevalent intestinal parasite (20%), while *Babesia* sp. (7%) was the predominant blood parasite. Zoonotic parasites including *Fasciola gigantica* (6%) and *Ascaris lumbricoides* (13%) were observed. The study revealed the burden of endoparasitic infections in cattle slaughtered at Kano abattoir, with significant variations based on sex, age, and breed. The presence of zoonotic parasites represents a significant public health threat to the consuming population.

Keywords: Endoparasites, Cattle, Abattoir, Prevalence, Public Health, Kano State, Nigeria

INTRODUCTION

Livestock production plays a vital role in the Nigerian economy, contributing significantly to food security, employment, and rural livelihoods (Abdullahi *et al.*, 2020). Cattle rearing, in particular, is an important agricultural enterprise, providing meat, milk, hides, and manure for crop production. Nigeria has one of the largest cattle populations in Africa, estimated at over 20 million heads, with the majority managed under extensive pastoral systems (WHO, 2019). Despite the economic importance of cattle production, productivity is severely constrained by various factors, including parasitic infections. Endoparasitic infections are among the most prevalent diseases affecting cattle in tropical and subtropical regions, causing substantial economic losses through reduced weight gain, decreased milk production, increased mortality, and condemnation of affected organs during meat inspection (Charlier *et al.*, 2020).

Endoparasites of cattle can be broadly categorized into gastrointestinal helminths, blood parasites, and protozoans. Gastrointestinal nematodes such as, *Haemonchus contortus*, *Cooperia* species, and *Ascaris* sp. are ubiquitous in grazing cattle and are responsible for significant production losses (Zvinorova *et al.*, 2016). Trematodes like, *Fasciola gigantica*, are of particular concern due to their zoonotic potential and association with liver condemnation (Nyindo & Lukambagire, 2015). Blood parasites, including, *Babesia*, and *Anaplasma* species, are transmitted by tick vectors and cause diseases such as babesiosis and anaplasmosis, which are characterized by fever, anemia, and mortality (Ola-Fadunsin *et al.*, 2018).

Several bovine endoparasites are zoonotic, posing direct public health risks to humans. *Fasciola* species cause fascioliasis in humans, an emerging food- and waterborne zoonosis with significant global health burden (WHO, 2019). *Ascaris lumbricoides* infection, though primarily a human parasite, can also affect cattle and represents a concern for human health through environmental contamination. Additionally, the consumption of improperly cooked beef from infected animals can serve as a source of human infection (Schneider *et al.*, 2015). Abattoir-based surveys represent an important epidemiological tool for monitoring livestock diseases, providing data that can inform disease control strategies and public health interventions (Fasina *et al.*, 2015). Kano State has one of the largest livestock populations in Nigeria, with extensive cattle production systems. The Kano abattoir, located in Kano metropolitan city, is one of the busiest in northern Nigeria, serving as a major source of beef for the state and neighboring regions. Despite the importance of this abattoir, limited data exist on the prevalence of endoparasitic infections among slaughtered cattle and their public health implications. In view of the foregoing, this research was carried out to determine the prevalence of endoparasitic infections among cattle slaughtered at Kano abattoir and evaluate the public health implications of the parasites.

MATERIALS AND METHODS

Study Area

The study was conducted at the Kano abattoir, located in Kano metropolitan city, Kano State, Nigeria (Latitude 12°0'N, Longitude 8°31'E). Kano State is situated in the Sudan-Sahelian agro-ecological zone, characterized by a tropical climate with distinct wet (May-October) and dry (November-April) seasons. The abattoir processes an average of 200-300 cattle daily, sourced from various parts of northern Nigeria and neighboring countries. Samples were collected from Kano main Abattoir situated in Fagge Local Government Areas within Kano Metropolis, Kano State, Nigeria. It was created on May 27, 1967 from part of northern region. Kano State borders Katsina State to the north-west, Jigawa State to the north-east,

Bauchi State to the South-east and Kaduna State to the South-west. The total land area of Kano State is 20, 131 square kilometers with a population of 20, 462, 200 based on KACCIMA (2025).

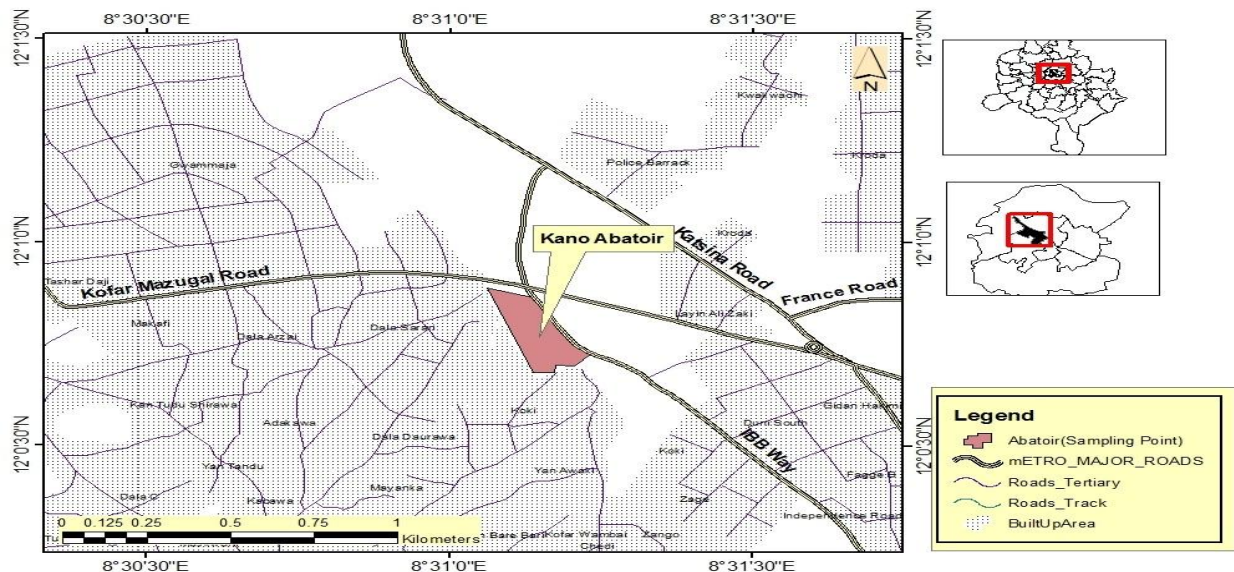


Figure 1: Map of the Study period (Source Catography Lab. Bayero University Kano, 2025)

Sample Size Determination

The sample size was calculated by using statistical formula as follows:

$$n = \frac{Z^2 \times P(1-P)}{d^2} \text{Where}$$

P = prevalence of haemoparasites and gastrointestinal parasites from the previous study 7.4% (0.074) according to Sulaiman *et al.* (2022) and 16% (0.16) according Vanisri *et al.* (2016). Giving the average of 11.7% (0.117)

d = at 5% margin error

Z = standard score at 95% confidence level usually set at 1.96.

$$\begin{aligned} n &= \frac{(1.96)^2 \times 0.117(1 - 0.117)}{(0.05)^2} \\ &= \frac{(1.96)^2 \times 0.117 (0.883)}{(0.05)^2} \\ &= \frac{3.8416 \times 0.103311}{0.0025} = \frac{0.3968795376}{0.0025} = 269.45 \end{aligned}$$

300 was used to improve the accuracy of data collection

Study Design and Sampling

Cross section study was used and animals were selected using a simple random sampling method. With a 50% expected prevalence, a 5% desired absolute precision, and a 95% confidence range, the sample size was 300 samples.

Sample Collection

Characteristics of population such as age, gender, breed were observed and recorded for each sample throughout the study (May to August, 2026). Gender differentiation was based on the appearance of external genitals while breed identification was based on their morphology.

Collection and Analysis of Stool Parasites

Fresh faecal samples were collected directly from the rectum of slaughtered cattle, (one sample per animal) from cattle were collected using a pair of hand gloves into clean labelled polythene bags. The samples were transferred to the Laboratory for further investigation. Each faecal sample were screened for intestinal parasites by formol-ether technique (Cheesbrough, 1999).

The Formol-ether concentration technique was used to analyze the samples. One (1g) of stool sample will be emulsified with 4 ml of 10% formol saline in a test tube. The mixture was filtered into a test tube using a cloth gauze and 3-4 mL of diethyl ether were added and shaken vigorously and allowed to stand for two minutes. The mixture was centrifuged at 1000 revolutions per minutes (1000 rpm) for 3 minutes. Using a glass rod, the faecal debris from the side of the tube was loosened and the tube was inverted to pour off the supernatants. The tube was returned to its original upright position and the fluid from the side of the tube allowed to drain to the bottom. The deposit was mixed by tapping the tube with the finger and using a Pasteur pipette. A drop of the sediment was applied on a microscope slide; covered with a cover slip and examined under the microscope using $\times 10$ and $\times 40$ objectives, Lugol's Iodine was also used as a stain (Yahaya and Tyav, 2014). Identification of parasites was done using standard keys of Cheesbrough (2009).

Collection and Analysis of Blood Samples

Five (5ml) of blood was collected from each animal at the point of slaughtering in sterile Ethylenediaminetetraacetic acid (EDTA) bottles as described by Sam-Wobo *et al.* (2016). The samples were transferred on ice packs for onward delivery to the laboratory for microscopic analysis. A drop of blood was placed on one end of a grease-free, and glass slide was used to produce a thin film of blood. In order to create the film with a feathered edge, a spreader was allowed to touch the blood at a 45° angle and then spread softly but firmly down the horizontal slide's surface. The blood sample was dragged behind the spreader. Following air drying, the thin film was fixed in absolute methanol for five minutes and stained for approximately thirty minutes using prepaed newly made 10% Giemsa stain at pH 7.2. The stained film was left to dry after being rinsed with buffered water. The thin film slide was examined under $\times 100$ oil immersion microscope (Ezenwaka *et al.*, 2024). The parasites were identified based on characteristic morphology described by Soulsby (1982).

Statistical Analyses

The prevalence of various species of the parasites were calculated by descriptive statistics. Chi square (χ^2) test was used to determine association between variables (endoparasites between the groups, sex, breed and age) and their degree of significance at 95% confidence interval. Risk Factors of Parasitosis in Cattle Slaughtered were analyzed using logistic regression. Odds ratios (OR) with the corresponding 95% confidence interval were used to explain the strength of associations between the dependent and independent variables.

RESULTS

Table 1 presents the combined prevalence of endoparasites (intestinal and blood parasites) based on sex. A total of 300 cattle were examined, with 60 animals (40.9%) were positive for

at least one parasite. Male cattle had a higher prevalence (23.3%, 29/124) compared to females (17.6%, 31/176). However, this difference was not statistically significant ($\chi^2 = 0.8421$, $p = 0.560$). The odds ratio for males compared to females was 1.58 (95% CI: 0.63-2.40).

Table 1: Combined Prevalence of Endoparasites Obtained from Cattle Slaughtered at Abattoir According to Sex

Sex	No. Examined	No. Positive	% Prevalence	Odds ratio (95% CI)	χ^2	p-value
Male	124	29	23.3	1.58 (0.63 to 2.40)	0.8421	0.560
Female	176	31	17.6	0.82 (0.70 to 2.35)		
Total	300	60	40.9			

The prevalence of intestinal parasites by sex is shown in Table 2. Intestinal parasites were detected in 36 animals (23.3%). Females showed a higher prevalence (13.63%, 24/194) compared to males (9.67%, 12/106). This difference was statistically significant ($\chi^2 = 0.543$, $p = 0.032$). The odds ratio for females was 1.89 (95% CI: 1.56-3.17).

Table 2: Prevalence of Intestinal Parasites According to Sex of Cattle

Sex	No. Examined	No. Positive	% Prevalence	Odds ratio (95% CI)	χ^2	p-value
Male	106	12	9.67	1.89 (1.56 – 3.17)	0.543	0.032
Female	194	24	13.63	1.41(1.33 – 2.67)		
Total	300	36	23.3			

The prevalence of blood parasites is presented in Table 3. Blood parasites were detected in 25 animals (16.10%). Females had a higher prevalence (9.65%, 17/166) compared to males (6.45%, 8/134). However, the difference was not statistically significant ($\chi^2 = 3.270$, $p = 0.060$).

Table 3: Prevalence of Blood Parasites According to Sex of Cattle

Sex	No. Examined	No. Positive	% Prevalence	Odds ratio (95% CI)	χ^2	p-value
Male	134	8	6.45	1.46 (1.47 – 3.34)	3.270	0.060
Female	166	17	9.65	1.56(1.43 – 4.54)		
Total	300	25	16.10			

Table 4 shows the combined prevalence based on age. Older cattle (>1-4 years) had a significantly higher prevalence (15.31%, 34/222) compared to younger cattle (0-1 years, 7.69%, 6/78). This difference was statistically significant ($\chi^2 = 0.780$, $p = 0.031$). The odds ratio for older cattle was 2.54 (95% CI: 2.09-4.95).

Table 4: Combined Prevalence of Endoparasites Based on Age of Cattle

Age	No. Examined	No. Positive	% Prevalence	Odds ratio (95% CI)	χ^2	p-value
0 – 1	78	6	7.69	0.65 (0.59 – 1.48)	0.780	0.031
>1 $\geq$ 4	222	34	15.31	2.54 (2.09 – 4.95)		
Total	300	40	23.00			

Breed-specific prevalence is presented in Table 5. The Sokoto Gudali breed had the highest prevalence (14.87%, 18/121), followed by White Fulani (12.90%, 12/93) and Red Bororo (8.13%, 7/86). The association between breed and prevalence was statistically significant ($\chi^2 = 3.980$, $p = 0.032$).

Table 5: Combined Prevalence of Endoparasites Based on Breeds Of Cattle

Sex	No. Examined	No. Positive	% Prevalence	Odds ratio (95% CI)	χ^2	p-value
White Fulani	93	12	12.90	0.89 (0.67 – 2.10)	3.980	0.032
Red bororo	86	7	8.13	1.71 (1.23 – 2.43)		
Sokoto Gudali	121	18	14.87	2.51 (2.15 – 4.43)		
Total	300	37	35.9			

Table 6 presents the distribution of parasites by taxonomic group. Among blood parasites, *Babesia* sp. was the most prevalent (7%), followed by *Anaplasma* sp. (2%). Among intestinal parasites, *Cooperia* sp. was the most common (20%), followed by *Ascaris lumbricoides* (13%), *Eimeriabovis* (7%), *Fasciola gigantica* (6%), *Haemonchus contortus* (5%), and hookworm (2%). The overall prevalence of intestinal parasites (53%) was higher than blood parasites (9%). The difference was not statistically significant ($\chi^2 = 0.0075$, $p = 0.0996$).

Table 6: Prevalence of Parasites Based On Taxonomic Group of Parasites

Sex	Blood parasites	% Prevalence	Intestinal parasites	% Prevalence	X2 Value	p-value
Protozoans	<i>Anaplasma</i> sp.	2	<i>Eimeria bovis</i>	7	0.0075	.0996
	<i>Babesia</i> sp.	7				
Trematoda			<i>Fasciola gigantica</i>	6		
			<i>Cooperia</i> sp	20		
Nematoda			<i>Ascaris lumbricoides</i>	13		
			<i>Haemonchus contortus</i>	5		
			Hookworm	2		
Total		9		53		

DISCUSSION

The overall combined prevalence of endoparasites in this study was 40.9%, indicating a substantial parasite burden in cattle slaughtered at the Kano abattoir. This finding is consistent with previous studies conducted in Nigeria. A study by Muhammed *et al.* (2025) in Kogi State reported a prevalence of 45.0%, while Musa *et al.* (2026) in Yobe State found a prevalence of 43.6%. However, this prevalence is lower than the 62.5% reported by Garba *et al.* (2024) in Katsina State, which may be attributed to differences in study design, sampling methods, and geographic variations in parasite distribution. The high prevalence observed underscores the widespread nature of parasitic infections in the study area and highlights the need for effective control programs. Environmental factors such as the tropical climate, which favors the development and survival of parasite infective stages, coupled with extensive grazing systems, contribute to the high infection rates (Ola-Fadunsin *et al.*, 2020). Additionally, poor management practices, including inadequate deworming programs and overstocking, might have exacerbated the situation in the present study.

Sex-related prevalence patterns revealed that intestinal parasites were significantly more prevalent in female cattle (13.63%) compared to males (9.67%) ($p=0.032$) is consistent with several studies in Nigeria and other tropical countries. This pattern has been attributed to several factors such as pregnancy and lactation in female cattle inducing immunosuppression, making them more susceptible to infections (Nabukenya *et al.*, 2014). Besides, the nutritional demands of pregnancy and lactation may compromise immune function, further increasing susceptibility to parasites (Oloyede *et al.*, 2023). However, the combined prevalence of both intestinal and blood parasites showed higher prevalence in males (23.3%) than females (17.6%), although this difference was not statistically significant. This pattern may reflect sex-related differences in grazing behavior and exposure to infective stages. Male cattle, particularly during the dry season, may graze over larger areas, increasing their exposure to contaminated pastures (Ola-Fadunsin *et al.*, 2020).

For blood parasites, although females had a higher prevalence (9.65%) than males (6.45%), the difference was not statistically significant ($p=0.060$). This finding suggests that sex may not be a major risk factor for hemoparasite infections, which are primarily vector-borne. Tick distribution and abundance are the primary determinants of blood parasite transmission, affecting both sexes equally (Mpofu *et al.*, 2020). The p -value indicates a trend that might become significant with a larger sample size. Age-related prevalence patterns indicates a significant higher prevalence of endoparasites in older cattle (>1-4 years, 15.31%) compared to younger animals (0-1 years, 7.69%) ($p=0.031$) is consistent with the widely reported pattern of age-related increase in parasite burden. This phenomenon is primarily attributed to cumulative exposure to infective parasite stages over time (Kouadio *et al.*, 2020). Older animals, having grazed on contaminated pastures for longer periods, accumulate greater parasite burdens. The high prevalence in older cattle has significant implications for cattle productivity, as chronic parasitic infections results in subclinical disease, reduced weight gain, and decreased fertility as reported by Patrobas *et al.* (2023).

Breed-related prevalence indicates a significant variation in parasite prevalence among the samples examined ($p=0.032$). The Sokoto Gudali breed had the highest prevalence (14.87%), followed by White Fulani (12.90%) and Red Bororo (8.13%). Many factors might be associated with the breed differences. For instance genetic factors could influence susceptibility to parasitic infections, as breeds differ in their ability to mount effective immune responses (Ridwan *et al.*, 2023). Some studies have documented breed-specific differences in resistance to gastrointestinal nematodes (Greer *et al.*, 2013). Management practices may also contribute, as different breeds may be raised under different husbandry

systems, affecting their exposure to parasite infective stages as reported by Khan *et al.* (2021). The lower prevalence in Red Bororo cattle may be partly attributed to genetic resistance or management practices that limit parasite exposure. This finding aligns with previous studies that have documented breed-specific susceptibility patterns in Nigerian cattle (Ola-Fadunsin *et al.*, 2018).

Taxonomic distribution of parasites revealed the predominance of *Cooperia* sp. (20%) among intestinal parasites which is consistent with its status as a common and economically important nematode of cattle as reported by Ameen *et al.* (2020). *Cooperia* species are known to cause significant production losses, particularly in young cattle (Balaraba-Musa *et al.*, 2021). The high prevalence of this parasite suggests it is endemic in the study area and constitutes a significant constraint to cattle production. The prevalence of *Ascaris lumbricoides* (13%) is notable for several reasons. It is a zoonotic parasite of human and animals. Its presence might indicate environmental contamination with human fecal samples (Ahmadu *et al.*, 2022). *Fasciola gigantica* (6%) is of significant concern due to its economic and public health importance. Fasciolosis causes substantial economic losses through liver condemnation during meat inspection, which has been estimated to cost millions of naira annually in Nigeria (Fasanmi *et al.*, 2013). The presence of this parasite in the current study indicates a zoonotic threat to the consuming population, as humans can contract fascioliasis through the consumption of contaminated water or aquatic plants (Nyindo and Lukumbagire, 2015).

Blood parasites examined were *Babesia* sp. (7%) and *Anaplasma* sp. (2%). The higher prevalence of *Babesia* sp. compared to *Anaplasma* sp. is consistent with other studies in Nigeria (Ola-Fadunsin *et al.*, 2018). Both parasites are transmitted by tick vectors and cause significant diseases in cattle. The prevalence of blood parasites (9%) was substantially lower than that of intestinal parasites (53%). This pattern is expected, as gastrointestinal nematodes are more directly transmitted through environmental contamination, whereas blood parasites require vector transmission (Brites-Neto *et al.*, 2015).

CONCLUSION

This study provides valuable data on the prevalence of endoparasitic infections in cattle slaughtered at the Kano abattoir. The overall prevalence of 40.9% indicates a substantial parasite burden, with intestinal parasites (23.3%) being more prevalent than blood parasites (16.1%). Significant risk factors for infection included sex (female for intestinal parasites), age (older), and breed (Sokoto Gudali). The identification of zoonotic parasites such as *Fasciola gigantica* and *Ascaris lumbricoides* is of particular concern, highlighting the public health risks associated with meat consumption from the abattoir. The study confirms that endoparasitic infections are a challenge to cattle production and public health in Kano State.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. It is recommended that regular strategic deworming using effective anthelmintics, pasture rotation, and improved hygiene are essential to reduce parasitic loads irrespective of cattle demographics.
2. Meat inspection protocols should be enhanced to ensure the systematic detection and condemnation of infected organs, particularly livers infected with *Fasciola* species.
3. Implementation and enforcement of stringent hygiene practices at the abattoir, including proper disposal of condemned materials and management of waste to prevent environmental contamination.

4. Proper measures of controlling haemoparasites in food animals should be sourced. Such as chemotherapy, chemoprophylaxis and control of arthropod vectors through the use of effective insecticides and environmental management.

Conflict of Interest: The authors declare no conflict of interest.

Funding: This study was funded by TETFund, Nigeria 2026

Acknowledgments: This research was possible through the financial support from TETFund given to the corresponding author. Immeasurable thanks go to Dr. Badamasi Inuwa, who proof read the manuscript. Our appreciation goes to Mal. Mubarak Sani Yakubu and Mal. Mustapha Ishaq of Biological Sciences Department, Bayero University, Kano who assisted during the laboratory and fieldwork. The authors thank the management and staff of Kano abattoir for their cooperation during sample collection. We also thank the Veterinary Parasitology Laboratory, Kano State, for technical support.

REFERENCES

- Abdullahi, U., Mohammed, A and Yakubu, S. (2020). Contribution of livestock to the Nigerian economy. *Journal of Agricultural Economics and Development*, 9(3): 45-58.
- Ahmadu, A., Nasallah, A., Saleh, A., Othman, I. M and Rifkatu, A B. (2022). Socio-Environmental Conditions and Prevalence of Intestinal Parasitic Infection among Children in Bauchi Metropolis, Bauchi State. *Asian Journal of Social Science and Management Technology*, 4(1): 1-7.
- Ahmadu, A., Nasallah, A., Saleh, A., Othman, I. M and Rifkatu, A B. (2022). Socio-Environmental Conditions and Prevalence of Intestinal Parasitic Infection among Children in Bauchi Metropolis, Bauchi State. *Asian Journal of Social Science and Management Technology*, 4(1): 1-7.
- Ahmed, L., Umar, B., and Yusuf, M. (2020). A study on ectoparasites of cattle in Northwestern Nigeria. *Tropical Animal Health and Production*, 52(5), 2129–2136.
- Ameen, A. M., Okafor, C. C., and Aliyu, I. (2020). Breed differences in susceptibility to gastrointestinal nematodes in cattle. *Veterinary Parasitology Research*, 14(3):155–163.
- Balarabe-Musa, L., Lawal, I.A and Ibrahim, A. (2021). Comparative prevalence of gastrointestinal helminths in male and female cattle in North-Central Nigeria. *Niger J Anim Sci.*, 43(1):122-8.
- Besier, R. B., Kahn, L. P., Sargison, N. D., & Van Wyk, J. A. (2016). Diagnosis, treatment and management of *Haemonchus contortus* in small ruminants. *Advances in Parasitology*, 93(1): 181-238.
- Bethony, J., Brooker, S., Albonico, M., Geiger, S. M., Loukas, A., Diemert, D., & Hotez, P. J. (2006). Soil-transmitted helminth infections: ascariasis, trichuriasis, and hookworm. *The Lancet*, 367(9521), 1521-1532.
- Bishop, S. C., Bairden, K., McKellar, Q. A., Park, M., & Stear, M. J. (2010). Genetic parameters for faecal egg count following mixed, natural and deliberate infection in Scottish Blackface sheep. *Animal Science*, 72(3), 439-448.

- Brites-Neto, J., Duarte, K. M and Martins, T. F. (2015). Tick-borne infections in human and animal population worldwide. *Veterinary World*, 8(3), 301-315.
- Charlier, J., Rinaldi, L., Musella, V., Ploeger, H. W., & Cringoli, G. (2020). Diagnosis, impact and management of gastrointestinal nematodes in cattle. *Veterinary Clinics: Food Animal Practice*, 36(1), 1-15.
- Fasanmi, O. G., Ajayi, O. O., & Ogundipe, G. A. T. (2013). Economic losses due to fasciolosis in cattle slaughtered at Ibadan abattoir, Nigeria. *Nigerian Veterinary Journal*, 34(3): 817-821.
- Fasina, F. O., Fasanmi, O. G., & Ogundipe, G. A. T. (2015). Abattoir-based surveillance as a tool for monitoring livestock diseases in Nigeria. *Journal of Veterinary Medicine and Animal Health*, 7(5): 165-172.
- Fry, J. M., Stutchbury, C. P., & Johnson, S. J. (2016). Age-related patterns of gastrointestinal nematode infection in beef cattle. *Australian Veterinary Journal*, 94(6): 176-182.
- Garba, U., Musa, A., & Bello, M. (2024). Prevalence of gastrointestinal parasites in cattle slaughtered at Katsina abattoir, Nigeria. *Journal of Parasitology Research*, 24(1): 1-8.
- Khan, T., Khan, W., Iqbal, R., Maqbool, A., Fadladdin, Y. A. J., Sabtain, T. (2021).Prevalence of gastrointestinal parasitic infection in cows and buffaloes in Lower Dir, Khyber Pakhtunkhwa, Pakistan. *Brazilian Journal of Biology*, 2023, vol. 83, e242677, <https://doi.org/10.1590/1519-6984.242677>
- Kouadio, K.P., Doumbia, A.J., Assoumou, K.(2020). Schistosomiasis prevalence and risk factors in cattle from Côte d'Ivoire. *Trop Anim Health Prod.*, 52(3):1557-65.
- Mpofu, T.J., K.A. Nephawe and B. Mtileni, (2020).Prevalence of gastrointestinal parasites in communal goats from different agro-ecological zones of South Africa.*Vet. World*, 13(1): 26 - 32.
- Muhammed, A., Ola-Fadunsin, S. D., & Abdullahi, U. (2025). Prevalence of endoparasitic infections in cattle slaughtered at Lokoja abattoir, Kogi State, Nigeria. *Nigerian Journal of Parasitology*, 46(1), 12-20.
- Musa, A., Garba, U and Bello, M. (2026). Prevalence of gastrointestinal parasites in cattle slaughtered at Gashua abattoir, Yobe State, Nigeria. *Journal of Veterinary Science and Animal Husbandry*, 14(2), 89-96.
- Nabukenya, I., Koen, M and Kijazi, B. (2014). The impact of pregnancy on the immune response to parasitic infections in cattle. *Veterinary Immunology and Immunopathology*, 162(1-2), 1-9.
- Nyindo, M., & Lukambagire, A. H. (2015). Fascioliasis: An ongoing zoonotic problem in sub-Saharan Africa. *Tanzania Journal of Health Research*, 17(1), 1-12.
- Ogbu, K. I., Okafor, E. O., & Eyo, V. O. (2015). Hookworm infection in Nigeria: A review. *International Journal of Tropical Disease and Health*, 9(1), 1-10.
- Ola-Fadunsin, S. D., Hussain, K., & Abdullah, F. (2018). Prevalence of tick-borne haemoparasites in cattle in Nigeria. *Veterinary Parasitology: Regional Studies and Reports*, 13, 144-149.

- Ola-Fadunsin, S.D., P.I. Uwabujo, I.N. Halleed and B. Richards, B. (2020). Prevalence and financial loss estimation of parasitic diseases detected in slaughtered cattle in Kwara State, North-Central Nigeria. *J. Parasitic Dis.*, 44: 1-9.
- Oloyede, S. Bolaji., Olutoyin, C., Adekunle., A. A., Abolaji, T. A., Margaret, A. Adekanle, O. J., Nimatullah, A., Akinwumi, I. A. (2023). Prevalence of Gastrointestinal Helminths in Cattle Reared in Owo, Ondo State, Nigeria. *Alexandria Journal of Veterinary Medicine*, 78(1): 28 -35.
- Patrobas, M.N., Elijah, M.O., Gurumyen, G.Y., Umaru-Sule, B., Akinsola, D. and Okubanjo, O.O (2025).The Prevalence of Haemo and endoparasites In Kano Brown Goats Slaughtered In Zaria Abattoir, Kaduna State. *Journal of Sustainable Veterinary & Allied Sciences*, 7(1): 13-16.
- Ridwan, F., Tarigan, R., Sari, N.P and Nurcahyani, D. (2023).Gastrointestinal parasites in domestic animals: Impacts and control measures. *Vet Res.*, 44(2):117-26.
- Sam-Wobo, S.O., Uyigue, J., Surakat, O.A., Adekunle, N.O. and Mogaji, H.O. (2016). Babesiosis and other heamoparasitic disease in a cattle slaughtering abattoir in Abeokuta, Nigeria. *International Journal of Tropical Disease & Health*, 1-5.
- Soulsby, E. L. B. (1982). *Helminths, Arthropods and Protozoan of Domestic Animals*. 7th Edition Bailliere Tindall, London, 516-538
- Sulaiman, M., Ahmed A., and Gobir AA., (2022). Haemo and Gastrointestinal Parasites in Cattle Slaughtered at Gwadabawa Abattoir in Sokoto State, Northwestern, Nigeria, *The Bioscientist Journal* Vol. 10 (1): 55-64.
- World Health Organization. (2019). *Control of foodborne trematode infections*. WHO Fact Sheet No. 368.
- Zvinorova, P. I., Halimani, T. E., Muchadeyi, F. C., Matika, O., Riggio, V., & Dzama, K. (2016). Prevalence and risk factors of gastrointestinal parasitic infections in goats in communal areas of Zimbabwe. *Tropical Animal Health and Production*, 48(8): 1593-1600.