AJBAR Vol. 5(5), October 2026: 101-114, ISSN: 2811-2881

Arid Zone Journal of Basic and Applied Research
Faculty of Science, Kashim Ibrahim University
Maiduguri, Nigeria

Journal homepage: https://www.azjournalbar.com

Review Article

A Review of Common Parasitic Diseases Affecting Dogs in Nigeria: Epidemiology, Diagnosis, and Zoonotic Implications: A Narrative Review

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ARTICLE INFO:

Keywords:
Canine parasites,
Endoparasites,
Ectoparasites,
Nigeria,
Zoonoses.

ABSTRACT

Parasitic infections in dogs are important veterinary and public health concerns in Nigeria because of their effects on animal health, welfare, and productivity, as well as their potential for zoonotic transmission. This narrative review examined parasitic diseases affecting dogs in Nigeria, focusing on their epidemiology, diagnosis, control, prevention, and public health implications. Relevant literature published between 2000 and 2026 was searched in PubMed/MEDLINE, Scopus, Web of Science, Google Scholar, African Journals Online (AJOL), and ScienceDirect, alongside reports from relevant international and Nigerian institutions. Nigerian studies were prioritised, while international literature provided additional context. Commonly reported parasites included *Ancylostoma caninum, Toxocara canis, Trichuris vulpis, Dipylidium caninum, Giardia, Cystoisospora, Cryptosporidium* species, *Babesia* species, ticks, fleas, lice, and mites. Reported gastrointestinal parasite prevalence ranged from 24.7% to 77.9% across selected Nigerian studies. Major risk factors included poor sanitation, inadequate veterinary care, irregular deworming, free-roaming behaviour, environmental contamination, and limited public awareness. Diagnosis relied mainly on faecal examination, microscopy, skin scraping, blood smears, PCR, and serology. The zoonotic importance of *T. canis, A. caninum,* and *D. caninum* supports integrated One Health control through routine veterinary care, antiparasitic treatment, ectoparasite control, sanitation, responsible dog ownership, public education, and strengthened surveillance.

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INTRODUCTION

Parasitic infections are among the most prevalent health problems affecting dogs globally, causing significant morbidity, reduced productivity, and in severe cases, mortality (Dixit et al., 2024). In tropical and subtropical regions such as Nigeria, environmental and climatic factors create ideal conditions for the proliferation and transmission of parasites (Chikezie et al., 2024). The high humidity, warm temperatures, and presence of abundant intermediate hosts and vectors such as ticks, fleas, and mosquitoes enhance the survival and spread of both internal and external parasites (Mojahed et al., 2022).

In Nigeria, the burden of canine parasitic diseases is further compounded by socioeconomic and cultural factors. Many dog owners lack access to veterinary healthcare, regular deworming programs, or effective ectoparasite control measures. Additionally, free-roaming and stray dogs often scavenge in unsanitary environments, facilitating the transmission of parasites through fecal contamination, ingestion of intermediate hosts, or direct contact with infected animals (Gado et al., 2023). Poor sanitation, inadequate waste management, and limited public awareness about zoonotic risks contribute significantly to maintaining high infection rates among dog populations (Kamani et al., 2021).

Parasitic infections in dogs are broadly categorized into endoparasitic and ectoparasitic infections. Endoparasites include gastrointestinal helminths such as *Ancylostoma caninum*, *Toxocara canis*, and *Trichuris vulpis*, as well as blood parasites like *Babesia canis* (Aleem et al., 2024). These parasites can cause severe clinical manifestations such as anemia, diarrhea, malnutrition, and general weakness, particularly in puppies and immunocompromised dogs (Jatav et al., 2024). Ectoparasites such as ticks (*Rhipicephalus sanguineus*), fleas (*Ctenocephalides canis*), and mites (*Sarcoptes scabiei*) infest the skin and fur, leading to itching, dermatitis, and secondary bacterial infections (Kumar et al., 2024).

Beyond their impact on animal welfare, many of these parasites have zoonotic importance, representing a major public health concern. Humans can acquire infections from close contact with infected dogs or through exposure to contaminated soil and environments. *Toxocara canis* and *Ancylostoma caninum*, for instance, are known to cause visceral and cutaneous larva migrans in humans, respectively (Rodriguez-Morales et al., 2021). Consequently, controlling parasitic infections in dogs is not only critical for improving animal health and productivity but also for preventing zoonotic transmission and safeguarding community health.

Effective management of canine parasitic infections in Nigeria requires an integrated One Health approach involving veterinary care, antiparasitic treatment, sanitation, responsible dog ownership, public education, and vector control (Gado et al., 2023; Yunusa et al., 2025).

This narrative review focuses primarily on parasitic diseases documented in Nigerian dogs, examining their epidemiology, diagnosis, control, prevention, and zoonotic implications. Relevant global evidence is also considered to provide biological and epidemiological context and aid interpretation of Nigerian findings. The review further highlights key geographical, climatic, demographic, socioeconomic, and management factors influencing parasite transmission and identifies gaps in surveillance, diagnosis, and control.

Review Methods

This study employed a narrative review of parasitic diseases affecting dogs in Nigeria, focusing on epidemiology, diagnosis, control, prevention, and zoonotic implications. Literature was searched in PubMed/MEDLINE, Scopus, Web of Science, Google Scholar, AJOL, and ScienceDirect, alongside information from WHO, WOAH, FAO, and relevant Nigerian institutions. Publications from 2000–2026 were prioritized, with older foundational studies included where relevant.

Studies were included if they addressed canine parasitic infections, prevalence, epidemiology, diagnosis, risk factors, treatment, control, prevention, or zoonotic significance. Studies unrelated to dogs or parasitic diseases, duplicate publications, and sources lacking sufficient or reliable information were excluded. Nigerian studies were prioritized, while international literature was used to provide additional biological, diagnostic, epidemiological, and zoonotic context.

Relevant data on parasite species, study location, prevalence, diagnostic methods, risk factors, clinical manifestations, control measures, and zoonotic importance were extracted and narratively synthesized under major themes: endoparasites, ectoparasites, epidemiology, diagnosis and control, and zoonotic implications.

Endoparasitic Infections

Endoparasitic infections represent one of the most significant health burdens in dogs across Nigeria, affecting both rural and urban canine populations. These internal parasites primarily gastrointestinal helminths and protozoa contribute to high morbidity and, in severe cases, mortality among infected dogs (Jajere et al., 2022; Pal et al., 2023). Environmental

contamination, poor hygiene, and lack of regular deworming contribute to their persistence and widespread distribution (Dixit et al., 2024).

GASTROINTESTINAL HELMINTHS

Several studies conducted across Nigeria have identified *Ancylostoma caninum* (hookworm), *Toxocara canis* (roundworm), *Dipylidium caninum* (tapeworm), and *Trichuris vulpis* (whipworm) as the predominant gastrointestinal helminths infecting dogs (Jajere et al., 2022; Adesoye et al., 2024). These parasites typically inhabit the intestinal tract, where they compete for nutrients and cause tissue damage. Clinically, infected dogs present with anemia, diarrhea, emaciation, dehydration, dull coat appearance, and reduced productivity (Jatav et al., 2024). *Ancylostoma caninum* is one of the most pathogenic nematodes, feeding on host blood and causing severe anemia and enteritis, particularly in puppies (Jajere et al., 2022). *Toxocara canis* poses a significant zoonotic threat, as humans, especially children, can become accidental hosts through ingestion of embryonated eggs from contaminated soil or dog feces, resulting in visceral or ocular larva migrans (Morsy et al., 2024). *Dipylidium caninum* infections, transmitted by the ingestion of infected fleas, are also widespread, underscoring the interconnectedness between internal and external parasite control in dogs (Rousseau et al., 2022).

Table 1: Nigerian studies on gastrointestinal helminths of dogs

Author/year	State/region	Sample size	Diagnostic method	Parasite species	Prevalence	Zoonotic relevance
Sowemimo and Asaolu (2008)	Ibadan, Oyo State, South-West	959	Modified Kato–Katz technique	*Ancylostoma* spp., *Toxocara canis, Trichuris vulpis, Dipylidium caninum, Taenia* spp., others	24.7% overall helminth infection	High; *Toxocara*, hookworms and some taeniids have zoonotic importance.
Ugbomoiko et al. (2008)	Ilorin, Kwara State, North-Central	396	Kato–Katz thick smear and microscopy	T*oxocara canis, Ancylostoma sp., Trichuris vulpis, Dipylidium caninum, Taenidae, Strongyloides* sp.	68.4% overall; *T. canis* and *Ancylostoma* spp. among the most common	High; particularly *T. canis, Ancylostoma* spp. and *D. caninum*.
Sowemimo (2009)	Ile-Ife, Osun State, South-West	269	Faecal examination/microscopy	*Toxocara canis* (33.8%), *Ancylostoma* sp. (34.6%), *Toxascaris leonina* (3.3%), *Trichuris vulpis* (3.7%), *Dipylidium caninum* (4.1%), *Uncinaria stenocephala* (0.7%), *Taenia* sp. (1.1%)	Species-specific prevalence as shown	High; *T. canis,* hookworms and *D. caninum* are zoonotically important.

Ayinmode et al. (2016)	Ibadan, Oyo State, South-West	203	Flotation technique; modified McMaster for egg/oocyst counts	*Ancylostoma* spp., *Toxocara* spp., *Uncinaria* spp., *Strongyloides* spp. and other GIT parasites	43.3% overall GIT parasites	High; study specifically addressed potentially zoonotic parasites in dog faeces.
Ezema et al. (2019)	Maiduguri, Borno State, North-East	200	Saturated sodium chloride flotation and microscopy	*Ancylostoma* spp., *Toxocara* spp., *Dipylidium* spp., *Taenia* spp.	31.5% overall GIT parasites; Ancylostoma spp. 16%	High; authors identified the detected parasites as having public-health/zoonotic significance.
Kamani et al. (2021)	11 states + FCT; Guinea, Savannah and Sahel ecological zones	948	Microscopy and molecular methods, including multiplex Qpcr	*Strongyloides stercoralis*, *Ancylostoma braziliense*, *A. caninum, Toxocara canis*	39.8% (377/948) had zoonotic helminth	Very high; nationwide study specifically investigated zoonotic GI parasites.
Jajere et al. (2022)	North-Eastern Nigeria	470	Standard parasitological/coprological techniques	*Ancylostoma caninum, Toxocara canis, Trichuris vulpis, Spirocerca lupi, Taenia/Echinococcus, Dipylidium caninum, diphyllobothriid* ova	77.9% overall; *A. caninum* 40.2%, *T. canis* 35.1%, *T. vulpis* 26.6%, *D. caninum* 10.9%	Very high; study explicitly identified a potential public-health risk.
Ola-Fadunsin et al. (2023)	Kwara Central, North-Central	305	Direct smear, centrifugation flotation, formol-ether concentration, modified Ziehl–Neelsen and modified McMaster	*Ancylostoma* spp., *Toxocara* spp., *Strongyloides stercoralis*, *Uncinaria stenocephala, Dipylidium caninum*	*Ancylostoma* 25.25%, *Toxocara* 19.02%, *S. stercoralis* 7.54%, *U. stenocephala* 6.89%, *D. caninum* 2.30%;	High; majority of identified intestinal parasites were considered zoonotic.

						overall intestinal parasites 54.43%

PROTOZOAN INFECTIONS

Among protozoan endoparasites, *Giardia spp.*, *Isospora spp.*, and *Babesia canis* are frequently reported in Nigerian dogs (Adeiza et al., 2023; Gruenberger et al., 2023). *Giardia* and *Isospora* species cause intestinal disturbances, leading to chronic diarrhea, malabsorption, and weight loss, particularly in young or immunocompromised animals.

Babesia canis, a tick-borne hemoprotozoan parasite, is of particular veterinary importance due to its high prevalence and pathogenicity. It is transmitted primarily by *Rhipicephalus sanguineus* (the brown dog tick), which thrives under Nigeria's warm and humid climatic conditions (Kyari et al., 2022). Infected dogs typically exhibit fever, hemoglobinuria, jaundice, lethargy, and severe anemia, which can result in death if untreated (Kalundia, 2024). The persistence of *Babesia* infections in Nigeria has been attributed to widespread tick infestation, inadequate tick control practices, and limited access to effective veterinary care, especially in rural communities (Kyari et al., 2022).

Table 2: Summary of Nigerian studies on protozoan endoparasites of dogs

Author/ year	State/region	Sample size	Diagnostic method	Protozoan species reported	Prevalence	Veterinary/zoonotic relevance
Sasaki et al. (2007)	Various regions of Nigeria	400	Nested PCR and sequence analysis of 18S Rrna	*Babesia canis rossi* and *B. canis vogeli*	2.3% positive; 2.0% *B. c. rossi* and 0.3% *B. c. vogel*	High veterinary importance; causes canine babesiosis and may produce haemolytic anaemia. Species were molecularly confirmed.
Ayinmode et al. (2016)	Ibadan, Oyo State	203	Faecal flotation and modified McMaster technique	*Isospora* sp., *Ancylostoma* spp., *Toxocara* spp., *Uncinaria* spp., *Strongyloides* spp.	*Isospora* sp. 14.2%; overall GIT parasites 43.3%	Mainly veterinary importance; study classified detected gastrointestinal parasites as having zoonotic potential.
Obeta et al. (2020)	Six Area Councils, FCT Abuja	480	Giemsa-stained blood smear, PCR and sequencing	*Babesia canis*; molecularly identified as B. canis vogeli	10.8% by microscopy; PCR/sequence confirmation	High veterinary importance. Infection was associated with tick infestation, season, age and dog use.

Jajere et al. (2022)	North-Eastern Nigeria	470	Coprological/parasitological examination	*Babesia* spp. was not the principal focus; study primarily assessed gastrointestinal parasites	—	Useful primarily for GI helminths rather than Babesia; should not be used as evidence for *B. canis.*
Ola-Fadunsin et al. (2023)	Kwara Central, North-Central Nigeria	305	Direct smear, flotation, concentration and modified McMaster techniques	*Cystoisospora* spp., *Cryptosporidium* spp.	*Cystoisospora* 15.41%; *Cryptosporidium* 25.25%	Veterinary importance; study noted zoonotic implications of several gastrointestinal parasites.
Abakpa et al. (2023)	Abeokuta, Ogun State, South-West	158	Centrifugal flotation and microscopic identification	*Isospora* spp. and gastrointestinal helminths	50.6% overall intestinal-parasite infection; *Ancylostoma caninum* 39%; *Isospora* particularly associated with younger dogs	Important for canine health; *Isospora*/*Cystoisospora* can cause enteritis, especially in puppies.

Effective management of these endoparasitic infections requires integrated parasite control programs involving regular deworming, tick prevention, public education on zoonotic risks, and improved veterinary health infrastructure. Failure to address these infections not only impacts canine health and welfare but also poses a growing public health risk through zoonotic transmission and environmental contamination.

Ectoparasitic Infections

Ectoparasitic infestations remain a major health challenge affecting dogs in Nigeria, contributing significantly to dermatological conditions, discomfort, and the transmission of other parasitic and bacterial diseases. The most commonly reported ectoparasites include ticks (*Rhipicephalus sanguineus*), fleas (*Ctenocephalides canis*), lice (*Trichodectes canis*), and mites (*Sarcoptes scabiei* and *Demodex canis*) (Jajere et al., 2023). These parasites thrive in Nigeria's warm, humid climate, which provides favorable breeding and survival conditions. The prevalence is especially high in dogs with limited veterinary care, poor hygiene, and frequent outdoor exposure (Adetayo et al., 2021).

Ticks, particularly *Rhipicephalus sanguineus*, are the most prevalent ectoparasites of dogs in Nigeria and have both direct and indirect pathological effects. Directly, they cause irritation, anemia, and skin trauma, while indirectly, they act as vectors for canine babesiosis (*Babesia canis*) one of the most important tick-borne diseases in Nigeria (Elelu et al., 2022). Heavy infestations often result in severe blood loss, dermatitis, and decreased

vitality in affected dogs (Ferrolho et al., 2025). The uncontrolled movement of stray dogs, lack of tick control programs, and increasing tick resistance to acaricides have contributed to their widespread distribution (Makwarela et al., 2025). Fleas (*Ctenocephalides canis*) and lice (*Trichodectes canis*) are also common external parasites infesting Nigerian dogs (Oguntomole et al., 2018; Jajere et al., 2023). Flea infestations lead to intense itching, allergic dermatitis, and secondary bacterial infections due to persistent scratching and skin damage (Jajere et al., 2023). Fleas are also of epidemiological importance because they act as intermediate hosts for the tapeworm *Dipylidium caninum*, which can infect both dogs and humans through ingestion of infected fleas (Rousseau et al., 2022). Lice infestations, though less common, are typically associated with poor nutrition and unhygienic conditions, causing pruritus, rough coat texture, and in severe cases, anemia (Siam et al., 2022).

Mite infestations, or mange, are among the most debilitating ectoparasitic conditions in dogs. *Sarcoptes scabiei* causes sarcoptic mange, characterized by severe itching, alopecia, thickened skin, and secondary bacterial infections. This form of mange is highly contagious and zoonotic, capable of causing transient skin lesions in humans through direct contact with infected animals (Thomson et al., 2023). *Demodex canis*, on the other hand, causes demodectic mange, often associated with immunosuppression, malnutrition, or hereditary factors. It presents with localized or generalized hair loss, erythema, and scaly skin (El-Moamly and El-Swify, 2025).

Ectoparasitic infestations not only impair the welfare and productivity of dogs but also pose public health risks through zoonotic transmission and by serving as vectors for multiple pathogens. Effective prevention and control require integrated strategies, including regular use of acaricides and insecticidal shampoos, improved hygiene, routine veterinary examinations, and public education on the health risks associated with ectoparasites (Pal et al., 2023).

Epidemiology

The epidemiology of parasitic diseases in dogs in Nigeria is shaped by a complex interaction of geographical, climatic, environmental, and socioeconomic factors. Studies across the country have shown that the prevalence, species diversity, and intensity of parasitic infections differ significantly between regions, largely due to variations in temperature, humidity, vegetation, and dog management practices (Gado et al., 2023; Iqbal et al., 2023).

GEOGRAPHICAL AND CLIMATIC INFLUENCES

In Nigeria, parasitic infections are more prevalent in southern and central regions, where warm temperatures, high humidity, and abundant rainfall create favorable conditions for the survival and transmission of parasite eggs, cysts, and vectors (Faheem & Abougalalah, 2025). These climatic conditions facilitate the development of helminth larvae in the soil and support the life cycles of ectoparasites such as ticks and fleas (Rizwan et al., 2023). Conversely, in northern Nigeria, where the climate is drier and cooler, parasite survival outside the host is reduced, leading to relatively lower prevalence rates (Chikezie et al., 2024). However, localized hotspots still exist, particularly in areas where irrigation and high dog population densities sustain transmission cycles.

SOCIOECONOMIC AND MANAGEMENT FACTORS

Socioeconomic conditions play a pivotal role in the distribution of parasitic diseases among dogs in Nigeria. Dogs in rural and peri-urban communities often experience higher infection rates compared to those in urban centers due to limited access to veterinary care, irregular deworming, poor sanitation, and the prevalence of free-roaming behavior (Gado et al., 2023). In such settings, dogs frequently scavenge for food in waste dumps and interact with other infected animals, increasing exposure to infective stages of endo and ectoparasites. In contrast, urban dogs, especially those kept as companion animals, tend to receive better nutrition, housing, and medical care, which collectively reduce infection risk (Mshelbwala et al., 2025).

AGE AND BREED SUSCEPTIBILITY

Epidemiological studies indicate that puppies and young dogs are more susceptible to parasitic infections than adults due to their underdeveloped immune systems and higher likelihood of exposure through contaminated environments or lactogenic transmission (Dixit et al., 2024). Certain breeds, particularly local or mixed-breed

dogs that roam freely outdoors, show higher infection prevalence than confined or exotic breeds (Jatav et al., 2024). Gender differences have also been reported, with slightly higher infection rates in male dogs, possibly due to their roaming and mating behaviors that increase exposure to contaminated environments (Tion et al., 2019).

REGIONAL VARIATIONS AND ZOONOTIC RISK

Regional epidemiological surveys have consistently highlighted a high prevalence of zoonotic parasites, including *Toxocara canis*, *Ancylostoma caninum*, and *Dipylidium caninum*, in both rural and urban dog populations (Rousseau et al., 2022; Pal et al., 2023). These infections not only affect animal health but also pose serious public health threats, especially in communities where close human-dog contact is common and hygienic practices are poor. The overlap between animal and human infection patterns underscores the need for a One Health approach to surveillance, prevention, and control (Ellwanger et al., 2021).

Diagnosis and Control

The diagnosis and control of parasitic infections in dogs are fundamental to improving canine health and reducing zoonotic transmission risks in Nigeria. Accurate diagnosis allows for targeted therapy, while sustained preventive measures minimize reinfection and community spread. Despite the availability of various diagnostic techniques, veterinary diagnostic capacity in Nigeria remains limited, particularly in rural and peri-urban areas where infections are most prevalent (Kamani et al., 2021).

DIAGNOSIS

The diagnosis of parasitic infections in dogs involves different laboratory techniques depending on the parasite group, including gastrointestinal helminths, intestinal protozoa, hemoparasites, and ectoparasites. Clinical examination provides preliminary evidence of infection, but laboratory confirmation is important for accurate parasite identification and appropriate treatment (Foreyt, 2013).

Fecal examination is a major diagnostic approach for intestinal helminths. Techniques such as direct smear, fecal flotation, sedimentation, and quantitative egg-count methods, including the McMaster technique, are used to detect and quantify parasite eggs or larvae. These methods are useful for identifying helminths such as Ancylostoma caninum, Toxocara canis, and Trichuris vulpis (Zajac et al., 2021). However, the sensitivity of fecal microscopy may be low in light infections, prepatent infections, and infections involving parasites that shed eggs intermittently. Furthermore, eggs of some closely related helminth species have similar morphological characteristics, making species-level identification difficult without molecular confirmation.

Intestinal protozoan infections, including those caused by Giardia duodenalis and Cystoisospora species, can be diagnosed using direct fecal smears, fecal flotation, and concentration techniques. Zinc sulfate centrifugal flotation is particularly useful for detecting Giardia cysts, while antigen-detection assays, direct immunofluorescence, and polymerase chain reaction (PCR) can improve diagnostic accuracy (Garcia et al., 2018; Zajac et al., 2021). Nevertheless, microscopy may produce false-negative results when parasite burdens are low or cyst and oocyst shedding is intermittent. Morphological similarities among some protozoan species may also limit accurate identification, making confirmatory testing necessary in selected cases.

Blood-borne parasites in dogs can be investigated using stained blood smears, hematological examination, serological assays, and molecular techniques. Thin blood smears stained with Giemsa or appropriate rapid stains may reveal intraerythrocytic organisms belonging to Babesia species, while morulae associated with Ehrlichia canis may occasionally be observed in leukocytes. Buffy-coat examination can also assist in detecting selected blood parasites. However, microscopy has limited sensitivity in chronic infections and infections with low parasitemia, and morphological similarities may prevent reliable differentiation of closely related species. Molecular techniques, particularly PCR and DNA sequencing, can improve sensitivity and facilitate species-level identification. Studies of canine blood-borne infections in Nigeria have demonstrated the value of molecular methods in detecting infections that may be missed by conventional microscopy (Happi et al., 2018).

The diagnosis of ectoparasitic infestations involves direct examination of the skin and coat, flea combing, tick collection, skin scraping, and microscopic examination of recovered specimens. These methods can identify fleas, ticks, lice, and mites, including Ctenocephalides felis, Ctenocephalides canis, Sarcoptes scabiei, and Demodex canis. Deep skin scrapings are particularly useful for investigating Demodex infestations, whereas superficial skin scrapings may assist in detecting Sarcoptes mites (Wall and Shearer, 1997). However, failure to recover parasites during sampling does not necessarily exclude infestation, particularly in cases involving low parasite burdens or inadequate sampling. Moreover, closely related flea, tick, and mite species may require expert morphological examination or molecular methods for definitive identification.

Advanced diagnostic techniques, including PCR, enzyme-linked immunosorbent assays (ELISA), and immunofluorescence assays, have improved the detection and identification of several canine parasites. Nevertheless, these techniques have different diagnostic purposes: PCR detects targeted parasite DNA, whereas serological tests generally detect antibodies or parasite antigens, depending on the assay used. Antibody detection may indicate previous exposure rather than active infection, and PCR results depend on appropriate specimen collection and assay performance (Ranjan et al., 2015). In Nigeria, the availability of advanced diagnostic facilities varies among veterinary practices, and costs, equipment limitations, and shortages of trained personnel may restrict their routine use. Consequently, some infections may remain undetected or be misidentified when diagnosis relies exclusively on clinical signs or conventional microscopy. Strengthening veterinary laboratory infrastructure, professional training, and access to molecular diagnostic services is therefore essential for improving the accurate diagnosis and control of canine parasitic infections.

CONTROL AND PREVENTION

Effective control of canine parasitic infections in Nigeria requires an integrated approach that combines chemotherapy, vector control, environmental management, and public health education (Ismail, 2025).

1. Regular Deworming and Chemotherapy: Routine administration of broad-spectrum anthelmintics such as fenbendazole or pyrantel pamoate can reduce gastrointestinal helminth burdens when selected and dosed according to veterinary guidance (Foreyt, 2013; Zajac et al., 2021). Puppies should begin deworming as early as two weeks of age, with treatments repeated at regular intervals to prevent reinfection (Foreyt, 2013; Zajac et al., 2021). For ectoparasitic infestations, acaricides such as amitraz, fipronil, and ivermectin are commonly used to control ticks, fleas, and mites (Coles & Lynn, 2014).

2. Vector and Environmental Management: Controlling ectoparasites requires regular cleaning of kennels, washing of bedding materials, and environmental treatment with insecticides to disrupt vector breeding cycles. Proper waste disposal and limiting dogs' access to contaminated areas reduce environmental transmission of helminth eggs and protozoan cysts (Blagburn & Dryden, 2009).

3. Improved Hygiene and Responsible Dog Ownership: Public education plays a critical role in controlling parasitic infections. Owners should be encouraged to bathe and groom their dogs regularly, provide clean drinking water, and avoid allowing dogs to roam freely (Miambo et al., 2025). Promoting responsible ownership also involves discouraging indiscriminate breeding and enhancing awareness of zoonotic risks.

4. Veterinary Services and Community-Based Programs: Regular veterinary check-ups and mass deworming or ectoparasite control campaigns organized at the community level can significantly reduce infection prevalence (Flores et al., 2025). However, the success of such programs depends on collaboration between veterinarians, local authorities, and public health agencies. Strengthening veterinary extension services and integrating dog health into One Health initiatives will enhance disease monitoring and prevention efforts (Pumipuntu & Suwannarong, 2025).

Zoonotic Implications

Many parasitic infections affecting dogs in Nigeria are zoonotic, meaning they can be transmitted to humans, posing significant public health threats. Common zoonotic parasites include *Toxocara canis*, *Ancylostoma caninum*, and *Dipylidium caninum*, all of which can infect

humans through direct contact with infected dogs or exposure to contaminated soil, feces, or vectors (Ayinmode et al., 2016).

Toxocara canis, the causative agent of toxocariasis, is particularly significant in Nigeria due to its prevalence among stray and poorly managed dogs. Humans, especially children, acquire infection by ingesting infective eggs present in contaminated soil or sand. The larvae migrate through body tissues, resulting in visceral larva migrans or ocular larva migrans, conditions that may lead to organ damage or blindness (Morsy et al., 2024; Sowemimo et al., 2017). Studies in southwestern Nigeria have reported high seroprevalence rates of *T. canis* antibodies among children, emphasizing the close association between poor sanitation, dog ownership, and human infection risk (Sowemimo et al., 2017).

Similarly, *Ancylostoma caninum* (dog hookworm) is responsible for cutaneous larva migrans in humans, characterized by serpiginous skin lesions due to larval migration within the epidermis. Infection occurs through skin penetration when individuals walk barefoot or come into contact with contaminated soil (Rodriguez-Morales et al., 2021). The warm, humid climate of many Nigerian communities provides favorable conditions for the survival and transmission of hookworm larvae, making environmental hygiene and footwear use vital preventive measures (Jajere et al., 2022).

Dipylidium caninum, transmitted through the ingestion of infected fleas, primarily affects children who play with or cuddle infested dogs. Although human infections are often asymptomatic, they can cause mild gastrointestinal disturbances such as abdominal discomfort and diarrhea (Rousseau et al., 2022). The persistence of flea infestations in domestic environments increases the likelihood of zoonotic transfer, highlighting the need for regular ectoparasite control in dogs.

Beyond commonly reported canine parasites, Echinococcus granulosus and Leishmania infantum warrant consideration as potential zoonotic threats in Nigeria. Echinococcus granulosus, the causative agent of cystic echinococcosis (hydatid disease), has been reported in dogs in southwestern Nigeria, suggesting that dogs may contribute to the transmission cycle of this zoonosis (Adediran et al., 2014). However, evidence on the prevalence and geographical distribution of canine echinococcosis remains limited. In contrast, the occurrence of Leishmania infantum in Nigerian dogs is insufficiently documented, and its prevalence should not be assumed without reliable parasitological or molecular confirmation. Although limited surveillance may contribute to underreporting, further epidemiological studies are required to establish the occurrence and public health significance of canine leishmaniasis in Nigeria. A One Health approach integrating veterinary medicine, human health, and environmental surveillance is therefore important for improving zoonotic disease detection, strengthening surveillance, and reducing potential transmission risks (Gado et al., 2023).

CONCLUSION

Canine parasitic infections remain an important veterinary and public health concern in Nigeria, involving gastrointestinal helminths, intestinal protozoa, hemoparasites, and ectoparasites. Nigerian studies have documented gastrointestinal helminths such as Ancylostoma caninum, Toxocara canis, Trichuris vulpis, and Dipylidium caninum, alongside intestinal protozoa including Giardia, Cystoisospora, and Cryptosporidium species. Blood-borne parasites, particularly Babesia species, and ectoparasites such as ticks, fleas, lice, and mites also contribute to canine morbidity and may facilitate the transmission of other pathogens.

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