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Prevalence and Diversity of Gastrointestinal Parasites Among Intensively and Semi-Intensively Managed Pigs in Lira (Blue-House) Community, Mubi-North Local Government Area, Adamawa State, Nigeria

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Abstract

Gastrointestinal parasitic infections are important constraints to pig production because they may impair growth, feed utilization, productivity and general animal health. This study was designed to determine the prevalence and diversity of gastrointestinal parasites among intensively and semi-intensively managed pigs in Lira (Blue-House), Mubi-North Local Government Area, Adamawa State, Nigeria. A cross-sectional study involving 120 pigs was proposed, comprising 60 intensively managed and 60 semi-intensively managed pigs. Fresh faecal samples were collected from individual pigs and examined using standard direct microscopy, sedimentation and flotation procedures. Information concerning age, sex, breed and management practices was obtained using a structured data sheet. In this result presented for manuscript development, 82 of 120 pigs were positive for at least one gastrointestinal parasite, giving an overall prevalence of 68.3%. The prevalence was higher among semi-intensively managed pigs (83.3%) than intensively managed pigs (53.3%). Strongyle-type eggs were the most frequently detected parasite, followed by Eimeria spp., Ascaris spp., Trichuris spp. and Strongyloides spp. Single infections accounted for 54 infected pigs, whereas 28 had mixed infections. The analysis also indicated higher infection among younger pigs and variation according to sex and breed. These patterns are consistent with reports that age, management practices, hygiene, deworming and environmental contamination can influence gastrointestinal parasitism in pigs.

Keywords: Pigs, gastrointestinal parasites, prevalence, diversity, intensive management, semi-intensive management, Mubi, Adamawa State, Nigeria.

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INTRODUCTION

Pig production contributes substantially to household income, animal protein supply, employment and agricultural livelihoods in many parts of Nigeria. The enterprise provides an important source of meat and income for both smallholder and commercial farmers, thereby contributing to food security and rural economic activities (Adesehinwa et al., 2024). Despite these benefits, the productivity and profitability of pig enterprises can be constrained by several factors, including infectious diseases, inadequate nutrition, poor housing, weak biosecurity and parasitic infections. Among these constraints, gastrointestinal parasitic infections are particularly important because they can persist within production systems and negatively affect animal health and productivity (Amoke and Nwosu, 2025).

Gastrointestinal parasites can adversely affect the health and productive performance of pigs, with the severity of their effects depending on the parasite species, parasite burden, age and physiological status of the host, as well as the prevailing management conditions. Infected pigs may experience reduced growth, impaired feed utilization, diarrhoea, anaemia and poor production performance, particularly when infections are heavy or involve pathogenic parasite species (Bernard et al., 2021). These effects may result in increased production costs and reduced economic returns to farmers. Consequently, understanding the occurrence and diversity of gastrointestinal parasites is important for developing appropriate parasite-control measures within pig production systems.

A wide range of gastrointestinal parasites have been reported in pigs. Important parasites include Ascaris suum, Trichuris suis, Strongyloides ransomi, strongyle-type nematodes, Metastrongylus spp., Balantidium spp. and coccidian parasites (Addy et al., 2023). These parasites differ in their life cycles, transmission patterns and pathogenic effects, and their occurrence may therefore vary between production environments. Some parasites have direct life cycles in which infective stages can accumulate within contaminated housing environments, whereas others may be associated with particular environmental conditions or intermediate hosts. The persistence and transmission of these parasites are consequently influenced by environmental contamination, stocking density, sanitation, feed and water hygiene and the effectiveness of parasite-control programmes (Abonyi and Njoga, 2020).

The management system under which pigs are raised is an important determinant of gastrointestinal-parasite exposure. Intensive and semi-intensive production systems may differ substantially in housing arrangements, stocking density, access to soil, cleaning frequency, feeding practices, water provision and opportunities for contact with contaminated environments. Such differences can influence the survival and accumulation of infective parasite stages and consequently affect the risk of infection among pigs (Amissah-Reynolds et al., 2023). In intensive systems, pigs may have relatively restricted access to natural environments, but inadequate cleaning, overcrowding or poor waste management can facilitate the accumulation of infective stages. Conversely, semi-intensive systems may provide greater opportunities for pigs to contact contaminated soil and other environmental sources of infection.

Evidence from Nigeria indicates considerable variation in the occurrence of gastrointestinal parasites among pig populations from different geographical areas and production environments. Unigwe et al. (2022), for example, reported gastrointestinal helminths in 62.85% of slaughtered pigs examined at Bodija Abattoir in Ibadan, with Ascaris suum recorded as the most prevalent parasite. Similarly, Bernard et al. (2021) reported gastrointestinal-worm infection in 68.1% of examined pigs in Enugu State, with strongyles,

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Ascaris, Trichuris and Metastrongylus among the parasites identified. These findings demonstrate that gastrointestinal parasitism remains an important health concern in Nigerian pig populations and that multiple parasite groups may occur simultaneously within the same production environment.

More recent findings further demonstrate the persistence and diversity of gastrointestinal parasites among pigs in Nigeria. In Umuahia South, Abia State, Amoke and Nwosu (2025) reported an overall intestinal-parasite prevalence of 73.0%, with Strongyloides ransomi identified as the most common parasite. Differences in the dominant parasite species between studies may reflect variation in geographical conditions, farm management, host characteristics, environmental contamination and parasite-control practices. Such variation emphasizes the importance of conducting location-specific epidemiological investigations rather than assuming that parasite prevalence and composition are uniform across different pig-producing areas.

Comparable evidence has also been reported from other West African countries. In Ghana, Addy et al. (2023) documented considerable gastrointestinal-parasite diversity among pigs, including Strongyloides ransomi, Hyostrongylus rubidus, Ascaris suum, Trichuris suis and coccidian parasites. Otoo et al. (2026) likewise reported gastrointestinal parasites in 68.5% of examined pigs, with Eimeria spp. and Strongyloides spp. among the frequently detected organisms. These findings indicate that porcine gastrointestinal parasitism is not restricted to a particular locality but occurs across different production environments in West Africa. Nevertheless, differences in parasite composition and prevalence between studies indicate that local environmental and management factors remain important determinants of infection.

The apparent variation in parasite occurrence between geographical locations may also be associated with differences in farm conditions and diagnostic procedures. Ahmed et al. (2023) reported that parasite profiles can vary according to geographical location, farm conditions and diagnostic approach. Differences in sampling strategy, animal age, management system, season, sample size and laboratory diagnostic methods can influence the parasites detected and the prevalence estimates obtained. Therefore, local studies using clearly defined sampling and diagnostic procedures are essential for generating reliable epidemiological information that can support evidence-based parasite-control programmes.

Despite the increasing number of studies on gastrointestinal parasites of pigs in Nigeria, information concerning pig populations in Mubi-North Local Government Area of Adamawa State remains limited. This geographical gap is important because parasite occurrence can vary considerably between locations according to environmental conditions, husbandry practices, sanitation and other management factors. Lira (Blue-House) Community provides an appropriate setting for investigating gastrointestinal parasitism because pigs are maintained under both intensive and semi-intensive management systems. Comparing these systems can provide useful information on whether differences in husbandry practices are associated with differences in parasite occurrence and diversity.

MATERIALS AND METHODS

Study area

The study was conducted in Lira (Blue-House) Community, Mubi North Local Government Area, Adamawa State, North-eastern Nigeria. Mubi North is part of the Mubi area, where smallholder agriculture and livestock production constitute important components of household livelihoods. Pig production is commonly practiced within the study community under different management systems, including intensive and semi-intensive systems.

Under semi-intensive management, pigs may have access to household compounds and surrounding areas where they can forage or come into contact with soil and other environmental materials. In contrast, intensively managed pigs are generally confined within designated housing facilities and provided with feed and water by the farmers. Differences in these management practices may influence the level of exposure of pigs to potentially contaminated soil, faecal material, feed, water and housing environments, thereby affecting the transmission of gastrointestinal parasites. The coexistence of intensive and semi-intensive pig production systems in Lira (Blue-House) Community therefore provides an appropriate setting for investigating the prevalence and diversity of gastrointestinal parasites and assessing their relationship with management practices.

Mubi North is located in the North-Eastern Part of Nigeria, it lies between latitude 10° 06' "and 10° 29'N, Longitude 13° 07' and 13°30'E. Mubi North Local Government is found in Adamawa State which is surrounded by Mubi South, Maiha and Michika Local Government. People living in Lira (Blue-House) are mainly farmers by occupation while some are involved in traditional activities such as rearing of pigs, cattle, poultry, hand waved cloth, wood carving, leather work and Zana matt etc.

The major ethnic group and language found in Lira (Blue-House) is Fali. Some of occupations found in Lira (Blue-House) are rearing of cattle, pigs, poultry, fishing, some mineral resources found in Lira (Blue-House) are coal and Clay rocks. (Adebayo, et al; 2020) Fig 1.

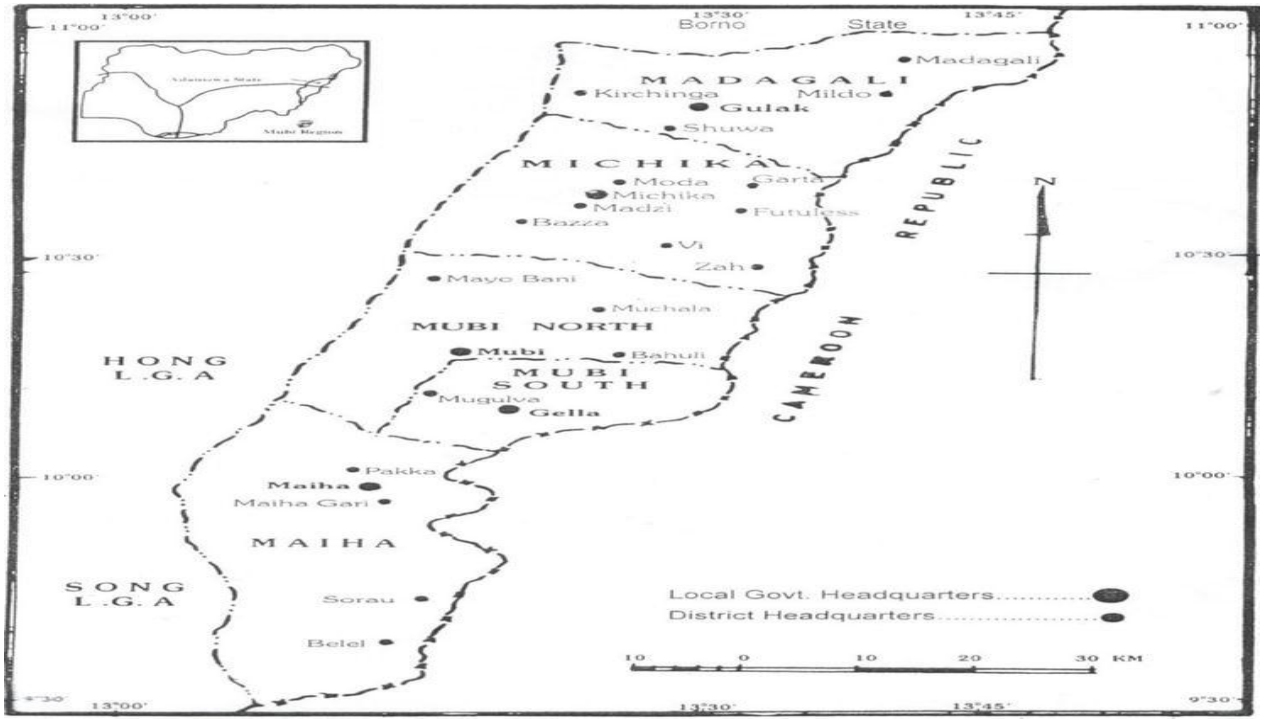


Fig. 1: Map of Adamawa State Showing the location of the Study Area - Mubi North Local Government Area

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STUDY DESIGN

A cross-sectional epidemiological design was proposed for the investigation. The study involved 120 pigs selected from farms practising either intensive or semi-intensive management. The sample comprised of 60 intensively managed pigs and 60 semi-intensively managed pigs. Information concerning the age, sex, breed and management system of each pig was recorded before sample collection.

Sample size and sampling procedure

A total of 120 pigs were examined. Sixty pigs were selected from intensively managed farms, while another 60 pigs were selected from semi-intensive farms. Individual pigs were selected using simple random or systematic sampling where farm conditions permit. Only pigs whose owners provide consent and whose faecal samples can be collected appropriately were included.

DATA COLLECTION

A structured data-collection form was used to obtain information on management system, age, sex, breed, housing, cleaning frequency, access to outdoor areas, source of feed and water and deworming practices. The information is important because Nigerian studies have linked gastrointestinal infections with management-related factors such as hygiene, feed preparation, mixing of age groups and deworming practices (Bernard et al., 2021).

FAECAL SAMPLE COLLECTION

Fresh faecal samples were collected directly from the rectum or immediately after defecation. Approximately 5–10 g of faeces was collected into appropriately labelled sterile containers. Samples were transported to the laboratory in a cool container and processed as soon as practicable.

LABORATORY EXAMINATION OF FAECAL SAMPLES

Faecal samples collected from the pigs were transported to the laboratory in clean, labelled, leak-proof containers and examined as soon as possible after collection. Fresh faecal material was preferred because prompt examination improves the detection and recognition of certain parasite stages, particularly fragile protozoan trophozoites (Conboy, 2025). Each sample was examined using direct microscopic examination, sedimentation and flotation techniques to improve the likelihood of detecting different gastrointestinal parasite stages.

For direct microscopic examination, a small portion of fresh faecal material was emulsified in a drop of normal saline on a clean glass microscope slide. A coverslip was gently placed over the preparation and the slide was examined systematically using the 10× objective, with the 40× objective used for detailed examination where necessary. The preparation was examined for helminth eggs, larvae, protozoan cysts and oocysts based on their characteristic morphological features. Direct microscopy is a simple and inexpensive diagnostic technique, although its sensitivity may be limited when parasite numbers in the faecal sample are low (Conboy, 2025).

For the sedimentation procedure, approximately 1–2 g of faecal material was thoroughly mixed with clean water and filtered through gauze to remove coarse debris. The filtrate was transferred into a clean tube and allowed to stand for approximately 5 minutes. The supernatant was carefully discarded and the sediment was re-suspended in clean water and allowed to settle again. The washing process was repeated, after which the final sediment was transferred onto a clean microscope slide, covered with a coverslip and examined microscopically. Sedimentation facilitates the concentration and detection of parasite stages that may not be efficiently recovered by flotation techniques (Conboy, 2025).

For the flotation procedure, a portion of faecal material was mixed thoroughly with an appropriate flotation solution and filtered to remove large debris. The resulting suspension was transferred into a flotation tube and additional flotation solution was added to form a positive meniscus. A coverslip was placed on the surface and the preparation was allowed to stand for approximately 5–10 minutes. The coverslip was then transferred onto a clean glass slide and examined microscopically using the 10× objective, with higher magnification used when required. The flotation technique concentrates parasite eggs and protozoal oocysts on the basis of differences in specific gravity between the parasite stages and the flotation medium (Ballweber et al., 2014; Conboy, 2025).

Where available, centrifugal flotation may be employed to improve the recovery of parasite eggs and protozoal cysts. Centrifugation generally increases the sensitivity of faecal flotation compared with passive flotation and is widely used for the detection of gastrointestinal parasite stages (Conboy, 2025). The results obtained from direct microscopy, sedimentation and flotation were recorded for each pig, and parasite stages were identified on the basis of their characteristic morphological features. Each positive sample was classified according to the parasite species or group detected and further categorized as a single or mixed infection. Recent pig studies have similarly used flotation and sedimentation procedures for gastrointestinal-parasite detection (Ogbe et al., 2024).

DATA ANALYSIS

Prevalence was calculated as:

Prevalence (%) = Number of infected pigs / Number of pigs examined × 100

The prevalence of individual parasite taxa was also being calculated. Chi-square or Fisher's exact test was used to determine associations between infection status and categorical variables such as management system, age, sex and breed. Statistical significance will be considered at $p < 0.05$.

RESULTS

Overall prevalence

Table 1. show the Overall prevalence of gastrointestinal parasites is, 82 of the 120 pigs examined were positive for at least one gastrointestinal parasite, giving an overall prevalence of 68.3%. This prevalence falls within the broad range reported in recent Nigerian and West African pig studies (Amoke and Nwosu, 2025; Addy et al., 2023).

Table 1. Overall prevalence of gastrointestinal parasites among the 120 pigs

Infection status	Number examined	Number positive	Prevalence (%)
Positive	120	82	68.3
Negative	120	38	31.7
Total	**120**	**82**	**68.3**

Prevalence according to management system

Table 2. results indicate that infection was higher among semi-intensively managed pigs than intensively managed pigs. Among the 60 intensively managed pigs, 32 were positive, corresponding to 53.3%. Among the 60 semi-intensively managed pigs, 50 were positive, corresponding to 83.3%.

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Table 2. Prevalence according to management system

Management system	No. examined	No. infected	Prevalence (%)
Intensive	60	32	53.3
Semi-intensive	60	50	83.3
Total	**120**	**82**	**68.3**

The difference between the two management groups would be tested statistically, and it is treated as significant ($\chi^2 = 12.49$, $p < 0.001$). This proposed pattern agrees with Nigerian evidence indicating that management conditions can influence gastrointestinal-helminth occurrence in pigs (National Society for Animal Production, 2024).

Diversity of gastrointestinal parasites

Seven major parasite categories are included in the results. Strongyle-type eggs were the most frequently detected, followed by *Eimeria* spp., *Ascaris* spp., *Trichuris* spp., *Balantidium* spp., *Metastrongylus* spp and *Strongyloides* spp.

Table 3. Distribution of gastrointestinal parasites detected

Parasite	Number positive	Prevalence (%)
Strongyle spp.	35	29.2
Eimeria spp.	24	20.0
Ascaris spp.	18	15.0
Trichuris spp.	16	13.3
Strongyloides spp.	14	11.7
Balantidium spp.	10	8.3
Metastrongylus spp.	5	4.2

The diversity in this is comparable with Nigerian and Ghanaian studies that have reported multiple nematode and protozoan parasites in pig populations (Addy *et al*., 2023). The occurrence of *Ascaris*, *Trichuris* and strongyle-type parasites is also consistent with recent Nigerian findings (Bernard *et al*., 2021).

Single and mixed infections

Of the 82 infected pigs, 54 had single-parasite infections while 28 had mixed infections.

Table 4. Pattern of gastrointestinal-parasite infection

Infection pattern	Number	Prevalence among infected pigs (%)	Prevalence among all pigs (%)
Single infection	54	65.9	45.0
Mixed infection	28	34.1	23.3
Total infected	**82**	**100.0**	**68.3**

The presence of mixed infections is epidemiologically important because pigs may simultaneously harbour several parasite taxa under conditions favouring environmental contamination. Recent Ghanaian work similarly documented multiple-parasite infections and reported that affected pigs could harbour between one and five distinct parasite types (Addy *et al*., 2023).

Table 5. Combinations of mixed infections

Mixed infection	Number
Strongyle + *Ascaris*	9
Strongyle + *Trichuris*	6
Ascaris + *Trichuris*	4
Strongyle + *Eimeria*	4
Ascaris + *Eimeria*	3
Strongyle + *Ascaris* + *Trichuris*	2
Total	**28**

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Association with age

For the age, pigs were divided into younger pigs and adults.

Table 6. Prevalence according to age

Age group	Examined	Infected	Prevalence (%)
Young pigs (<12 months)	72	55	76.4
Adults (≥12 months)	48	27	56.3
Total	**120**	**82**	**68.3**

The analysis suggests a higher prevalence among younger pigs ($\chi^2 = 5.01$; $p = 0.025$).

This pattern is consistent with Nigerian findings in which gastrointestinal worm infections were more frequent among young pigs than adults (Bernard *et al*., 2021). A Ghanaian investigation likewise recorded higher parasitism among pigs younger than two years than among older animals (Addy *et al*., 2023).

Association with sex

Table 7. Prevalence according to sex

Sex	Examined	Infected	Prevalence (%)
Male	56	35	62.5
Female	64	47	73.4
Total	**120**	**82**	**68.3**

The difference between male and female pigs was not statistically significant ($\chi^2 = 1.61$; $p = 0.204$).

A similar absence of a strong sex effect has been reported in recent Nigerian pig-parasite research (Amoke and Nwosu, 2025).

Association with breed

Table 8. Prevalence according to breed

Breed	Examined	Infected	Prevalence (%)
Large White	40	23	57.5
Landrace	32	25	78.1
Crossbred	28	21	75.0
Indigenous	20	13	65.0
Total	**120**	**82**	**68.3**

In this study, breed differences were statistically significant ($\chi^2 = 7.96$; $p = 0.047$). Recent Ghanaian research has similarly reported differences in gastrointestinal-parasite occurrence between pig breeds (Otoo *et al*., 2026). However, breed effects should be interpreted cautiously because breed may be correlated with management system, age, housing and farm type.

Management practices

Table 9. results indicate that irregular cleaning, inadequate deworming, outdoor access and mixed-age housing were associated with higher parasite prevalence. These factors are biologically plausible because environmental contamination and accumulation of infective stages can facilitate repeated exposure of susceptible pigs. Comparable risk practices, including inadequate sanitation, inappropriate feed handling and keeping pigs of different ages together, have been documented in Nigerian pig farms (Bernard *et al*., 2021).

Table 9. Management-related factors

Management factor	Category	Examined	Infected	Prevalence (%)
Pen cleaning	Daily	42	21	50.0
	Irregular	78	61	78.2
Deworming	Regular	47	24	51.1
	Irregular/none	73	58	79.5
Outdoor access	No	60	32	53.3
	Yes	60	50	83.3
Mixed-age housing	No	71	39	54.9
	Yes	49	43	87.8

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DISCUSSION

The overall prevalence of 68.3% indicates that gastrointestinal parasitic infection constitutes an important health concern among pigs in Lira (Blue-House) Community. This finding is comparable to the 68.1% prevalence reported among pigs examined in Enugu State, Nigeria, suggesting that gastrointestinal parasitism occurs at substantial levels in geographically distinct Nigerian pig populations (Bernard et al., 2021). However, the prevalence recorded in the present study was lower than the 73.0% reported among pigs from selected farms in Umuahia South, Abia State (Amoke and Nwosu, 2025). Similarly, the present estimate was lower than the 91.1% reported among pigs examined in the Tolon and Kumbungu districts of Ghana (Addy et al., 2023). Differences in prevalence between studies may be attributable to variation in environmental conditions, sample size, animal characteristics, management systems, diagnostic procedures, deworming practices and the spectrum of parasites investigated.

The relatively high prevalence observed in the present study suggests that gastrointestinal parasites may be maintained within the local pig production environment through continuous environmental contamination and transmission. The higher prevalence among semi-intensively managed pigs may be associated with their greater access to soil and outdoor environments, which can increase opportunities for contact with infective parasite eggs, larvae and oocysts. Semi-intensive systems may also expose pigs to contaminated pasture, soil, faecal material and inadequately protected feed or water sources. A Nigerian study presented through the Nigerian Society for Animal Production similarly reported a higher occurrence of helminth infection among semi-intensively managed pigs than among intensively managed pigs, although the magnitude of the difference may vary according to individual farms and management practices (Nigerian Society for Animal Production, 2024). The observed difference should therefore be interpreted within the context of the specific husbandry practices operating in Lira (Blue-House) Community.

The identification of several gastrointestinal parasite groups in the present study demonstrates that parasitism in pigs is not attributable to a single parasite taxon. Strongyle-type parasites constituted the most frequently detected group, which is consistent with findings from Enugu State, where strongyles represented an important component of gastrointestinal worm infections in pigs (Bernard et al., 2021). Strongyle infections may be facilitated by the accumulation of infective stages in contaminated environments, particularly where sanitation and faecal-waste management are inadequate. The detection of strongyle-type parasites therefore highlights the potential importance of environmental management in reducing transmission within pig production units.

The detection of Ascaris spp. is also epidemiologically important because Ascaris suum is a commonly reported gastrointestinal parasite of pigs and its eggs are capable of persisting in contaminated environments. Unigwe et al. (2022) reported Ascaris suum as the most prevalent gastrointestinal helminth among slaughtered pigs examined at Bodija Abattoir in Ibadan, Nigeria. The persistence of Ascaris eggs in the environment may facilitate repeated exposure of pigs, particularly where contaminated faecal material is not effectively removed from pens and surrounding areas. Consequently, regular cleaning and appropriate manure management may be important components of parasite-control programmes in the study area.

The occurrence of Trichuris spp. in the present study is also consistent with previous reports from Nigerian and Ghanaian pig populations. Addy et al. (2023) identified Trichuris among the gastrointestinal parasites infecting pigs in Ghana, while Nigerian studies have similarly documented the occurrence of Trichuris in pigs. The presence of this parasite indicates that environmental contamination may play an important role in maintaining transmission because infective stages can persist in suitable environments. Differences in the prevalence of Trichuris between studies may nevertheless reflect variation in climate, housing conditions, stocking density, sanitation and diagnostic sensitivity.

The detection of Eimeria spp. further demonstrates the diversity of gastrointestinal parasites occurring among the pigs examined. Coccidian parasites have also been reported in recent investigations of pigs, including the study by Otoo et al. (2026), in which Eimeria spp. occurred among the frequently detected gastrointestinal parasites. The presence of coccidian organisms may be associated with environmental contamination and the accumulation of infective oocysts where faecal material is not adequately removed. Their detection reinforces the need for parasite-control programmes to consider both helminthic and protozoan infections rather than focusing exclusively on gastrointestinal worms.

The occurrence of mixed infections in the present study demonstrates the importance of examining infection patterns in addition to reporting overall prevalence. Mixed infections may expose pigs to the combined effects of several parasite groups and can complicate the interpretation of clinical signs because different parasites may produce overlapping manifestations. Bernard et al. (2021) similarly documented combinations involving strongyles, Ascaris and Trichuris among pigs examined in Enugu State. The occurrence of mixed infections may reflect common exposure to contaminated environments and shared transmission pathways, particularly where several parasite species are maintained within the same production system.

The higher prevalence observed among younger pigs may be related to differences in exposure, developing immunity and susceptibility to gastrointestinal parasites. Young pigs may have less developed acquired immunity and may therefore be more susceptible to infection following exposure to contaminated housing environments. Increased environmental contamination in pens can further increase exposure where young animals are housed together or where cleaning practices are inadequate. Addy et al. (2023) also observed age-related differences in gastrointestinal-parasite occurrence among pigs, although the direction and magnitude of age-associated effects may differ between study populations. Such differences emphasize the importance of considering age alongside management and environmental factors when interpreting parasite prevalence.

The sex-specific comparison showed a numerically higher prevalence among female pigs, although the difference was not statistically significant. This finding suggests that sex alone may not be an important determinant of gastrointestinal-parasite infection within the study population. Amoke and Nwosu (2025) similarly reported findings indicating that differences in parasite occurrence between sexes may not necessarily represent an independent effect of sex when other host and management factors are considered. The observed numerical difference between male and female pigs may therefore reflect differences in age composition, management exposure or other farm-level factors rather than a direct biological effect of sex.

The differences in parasite prevalence observed among breeds should also be interpreted cautiously because breed may be associated with differences in management and production purpose. Particular breeds or breed types may be preferentially maintained under specific management systems, making it difficult to separate an apparent breed effect from environmental or husbandry-related exposure. Nevertheless, Otoo et al. (2026) reported significant breed-associated differences in gastrointestinal-parasite prevalence among pigs in Ghana, indicating that breed-related variation may warrant further investigation. Future studies involving larger numbers of pigs from different breeds and comparable management conditions could help clarify whether breed has an independent influence on gastrointestinal-parasite susceptibility.

The association between irregular deworming and increased parasite prevalence is biologically plausible because inadequate or inconsistent parasite-control practices may allow infections to persist within herds and permit continued environmental contamination. When infective parasite stages remain in housing areas, pigs may become repeatedly exposed even after treatment. Abonyi and Njoga (2020) identified the absence or infrequent use of routine deworming as an important management consideration associated with gastrointestinal-worm infection in pigs. Amoke and Nwosu (2025) likewise emphasized regular deworming, improved

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hygiene and farmer education as important components of gastrointestinal-parasite control. However, the effectiveness of deworming programmes may depend on treatment frequency, drug selection, correct dosing, compliance and the possibility of reduced drug efficacy resulting from inappropriate use.

Environmental sanitation is consequently an important component of gastrointestinal-parasite control in pig production. Parasite eggs, larvae and oocysts may accumulate in contaminated pens, soil and other areas where pigs have frequent contact with faecal material. Poor removal of manure and inadequate cleaning can therefore increase opportunities for repeated exposure and reinfection. Agumah et al. (2024) demonstrated the occurrence of intestinal parasite stages in effluent slurries from piggeries in Enugu, highlighting the potential importance of contaminated farm waste in the epidemiology of gastrointestinal parasites. Improved manure disposal, regular cleaning of pens, provision of clean feed and water, appropriate stocking density and implementation of effective deworming programmes should therefore form part of an integrated parasite-control strategy for pigs in Lira (Blue-House) Community.

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