PREVALENCE OF GASTROINTESTINAL AND HAEMOPARASITES OF PIGS SLAUGHTERED IN SOME ABATTOIRS IN MAKURDI, NIGERIA

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ABSTRACT

This study was conducted to determine the prevalence of gastrointestinal and haemoparasites of pigs slaughtered in six abattoirs in Makurdi, Benue State. One hundred blood and 550 faecal samples were collected from 650 pigs and analyzed using floatation technique and thin blood smear for faecal and blood samples respectively. Results showed that 6.0% pigs tested positive for haemoparasites and 56.3% pigs were infected with gastrointestinal parasites. Nine parasites were recorded in the study which included seven gastrointestinal parasites: *Ascaris suum* 158(24.3%), *Strongyloides ransomi* 66(10.2%), *Oesophagostomum* spp 35(5.4%), *Trichuris suis* 30(4.6%), *Taenia solium* 13(2.0%), *Fasciolopsis buski* 2(0.3%) and *Girdia lamblia* 1(0.2%); and two haemoparasites: *Babesia* species 10(1.5%) and *Mycoplasma* spp 27(4.2%). In both gastrointestinal and haemoparasites prevalence, no significant difference was observed in relation to sex, ($P > 0.05$). The highest prevalence for single and mixed infection with helminths was recorded within the age group of 1-6 months (76.5%) and 25 – 30 months (16.7%), respectively. Also, ages 19 – 24 months had the most single (41.5%) and mixed (3.1%) infections with haemoparasites. Wadata abattoir had the highest infection rate but the difference in prevalence based on location was not statistically significant ($P>0.05$). The prevalence of helminth parasites of pigs recorded in the study calls for collaborative efforts of human and veterinary health officers to prevent zoonosis.

Keywords: Gastrointestinal, Haemoparasites, Makurdi, Pigs, Prevalence
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INTRODUCTION

Domestic pigs are susceptible to a wide range of infectious and parasitic diseases, some of which are limited to pigs while others are shared with other species of wildlife and domestic livestock. Parasites of pigs cause major economic loss globally as a consequence of reduced feed conversion resulting in weight loss and the condemnation of affected organs found after slaughter [1, 2]. Most heamoparasites that affect pigs are mostly vector-borne and these are: *Theileria*, *Babesia* and *Trypanosoma*, e.t.c. [3, 4]. Gastrointestinal helminths are transmitted through oral ingestion of parasite eggs or cysts from the environment. Once ingested, the parasites undergo their life cycle in the pigs, consequently resulting in slower growth and lowered disease resistance [5]. In cases where the internal organs are affected it leads to condemnation of such parts as meat resulting to great nutritional and economic loss [6].

Swine industry in developing countries with particular reference to Nigeria is faced with a number of constraints prominent among which is disease. In as much as more focus is placed on bacterial and viral infections, gastrointestinal and haemoparasites are equally important although often neglected. The incidence and prevalence of parasites in pigs have been studied in Nigeria; such as Plateau [7, 8] and Imo States [9], Africa; Botswana [10], Kenya [11] and Zimbabwe [12] and other parts of the world such as China and South Georgia [5, 2].

In Benue State, there is inadequate information on parasites associated with pigs to serve as a yardstick for piggery management and prevention of zoonotic infection. This study was conducted to provide information on gastrointestinal and haemoparasites of pigs slaughtered in Makurdi, Nigeria.

MATERIALS AND METHODS

Study area

The study was conducted in Makurdi, the capital of Benue State, Nigeria. The state lies in the middle belt region of the country and is situated between latitude 7º 15´ - 7º45´ and longitude 8º 15´ - 8º40´. Makurdi lies in the southern guinea savannah vegetation region, on the bank of the second largest river In Nigeria, the Benue. The town has five abattoirs, located in Modern Market (Latitude 7.7226602; Longitude 8.5008831), North Bank (Latitude 7.8128; Longitude 8.65144), Wurukum (Latitude 7.7271767; Longitude 8.544121), Rail way market (Latitude 7.73427; Longitude 8.54259), Wadata (Latitude 7.73406; Longitude 8.5202) and Fiidi (Latitude 7.71669; Longitude 8.6196) located in the out sketch area. Samples were acquired from abattoirs because the majority of the pork sold and consumed within the metropolis originates from there.

Sample collection

With aid from veterinarians and butchers, carcass inspection was carried out in the six abattoirs. Detailed post mortem examination based on standard meat inspection procedure was carried out on 650 randomly selected carcasses of pigs with more attention being

paid to the bowels to determine the presence of gastrointestinal parasites.

Six hundred and fifty (650) pigs slaughtered at six abattoirs in Makurdi between August and November, 2015 were examined for endoparasites and blood parasites. Sex and age differences in parasite distribution were noted. The intestinal and blood parasites were collected from five groups according to their ages of 6 months interval. Therefore, animals in Group I were between the ages of 1 and 6 months and group V were between 25 to 30 months. Age and sex were assessed on the basis of dentition and physical traits, respectively [7]. From each animal, thin blood smears were prepared, fixed in methyl alcohol and stained in 10% Giemsa. Slides were observed at x100 magnification and blood parasites identified [13]. Faecal samples from all the pigs were examined for gastrointestinal helminths using floatation method [14]. Parasite eggs and adult worms recovered were identified using keys adopted by Soulsby [15]. The physical appearance of the pigs before they were sacrificed was also noted for each location.

Statistical analysis

Data was analysed using simple percentages and chi square was used to check for association between occurrence of helminth parasites and age, sex, sampled location and physical appearance of pigs.

RESULTS

Figure 1 shows the prevalence of gastrointestinal and haemoparasites of slaughtered pigs in Makurdi. Nine parasites were recorded in the study which included six gastro-intestinal parasites: *Ascaris suum* 158(24.3%), *Strongyloides ransomi* 66(10.2%), *Oesophagostomum* species 35(5.4%), *Trichuris suis* 30(4.6%), *Taenia solium* 13(2.0%), *Fasciolopsis buski* 2(0.3%) and *Girdia lamblia* 1(0.2%) and two haemoparasites: *Babesia* spp 10(1.5%) and *Mycoplasma* spp 27(4.2%).

Figure 2 shows the prevalence of single and mixed infections with gastrointestinal parasites in pigs in relation to location. The pigs had various levels of parasitaemia with 305(46.9%) single infection and 61(9.4%) having mixed infection of at least two of the species of the helminthes. The highest prevalence was recorded in Wurukum 125(19.2%) followed by Modern market 92(14.2%), Railway 77(11.8%), and the least prevalence was recorded in Northbank abattoir 35(5.4%). Fiidi and Wadata had same prevalence of infection 38(5.9%). There was statistically significant difference ($P<0.05$) in the prevalence of infection in Wurukum as compared to Northbank and Fiidi.

Figure 3 shows the prevalence of single and mixed haemoparasite infections in pigs in relation to location. Single infections were documented in Wurukum 3(0.5%) and Railway 34(5.2%). A prevalence of 2(0.3%) for mixed infection was documented from Wurukum abattoir.

Figure 4 shows the distribution of parasites infection with respect to sex of pigs studied. For gastrointestinal parasites, 198(83.9%) single infection and 26(11.0%) mixed infection was seen in males while 107(63.3%) single and 35(32.7%) mixed infections was recorded in females. The results were statistically non-significant (P.0.05). Also, there was 12(5.1%) and 25(14.85) single haemoparasite prevalence in males and females, respectively while mixed infection was seen in females 2(1.2%) only.

Figure 5 shows the prevalence of gastrointestinal helminths infection in respect to age of pigs. Age group 1 to 6 months 139(81.8%) had higher prevalence followed by 25 to 30 months 6(50.0%) and the least prevalence was recorded in age 19 to 24 months 23(21.5%). All age groups manifested various degrees of multiple infections. There was a statistically significant difference ($P<0.05$) in prevalence among the different age groups.

The prevalence of haemoparasite infestation and age of pigs sampled is as presented in figure 6. Single helminths infection was recorded in ages 7 – 12 months 2(20.0%), 13 to 18 months 8(32.0%) and 19 to 24 months 27 (41.5%) while mixed parasites infection was seen in only ages 19 to 24 months 2 (3.1%).

The prevalence of both haemo and gastrointestinal parasites in respect to physical appearance of pigs is as shown in Figure 7. Single gastrointestinal parasite infestation ranged from; Fat 121(80.7%), Moderate 53(84.1%) to Pale/Thin 126(82.4), while the highest prevalence for mixed infection was recorded in Fat pigs 29(19.3%).

Single infection with haemoparasites consisted of 13(100.0%), 19(95.0%) and 5(83.3%) in pigs that looked fat, moderate and Pale/thin, respectively. Mixed infections were limited to pigs that had Moderate 1(5.0%) and Pale/thin 1(16.7%) appearances.

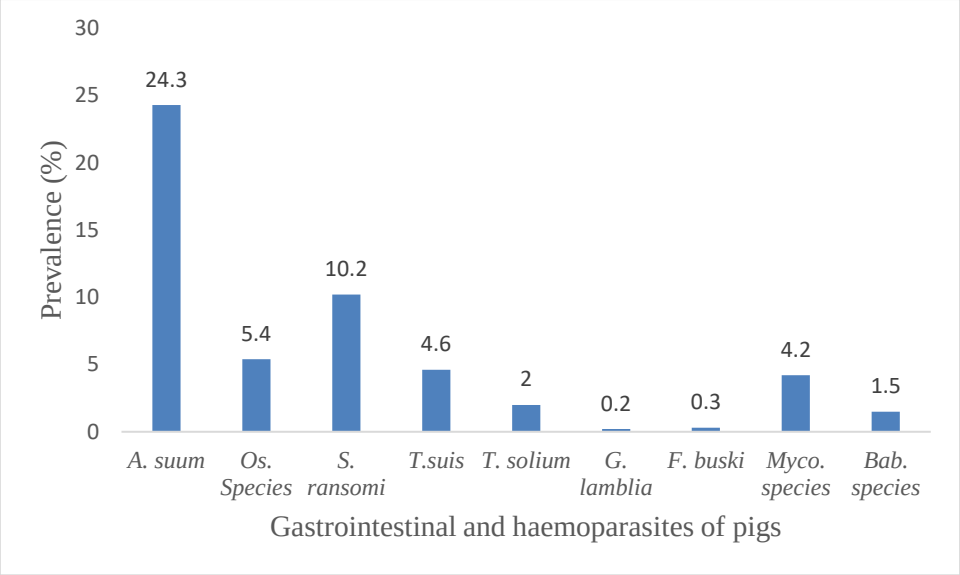

Figure 1: Prevalence of gastrointestinal and haemoparasites of slaughtered pigs in Makurdi

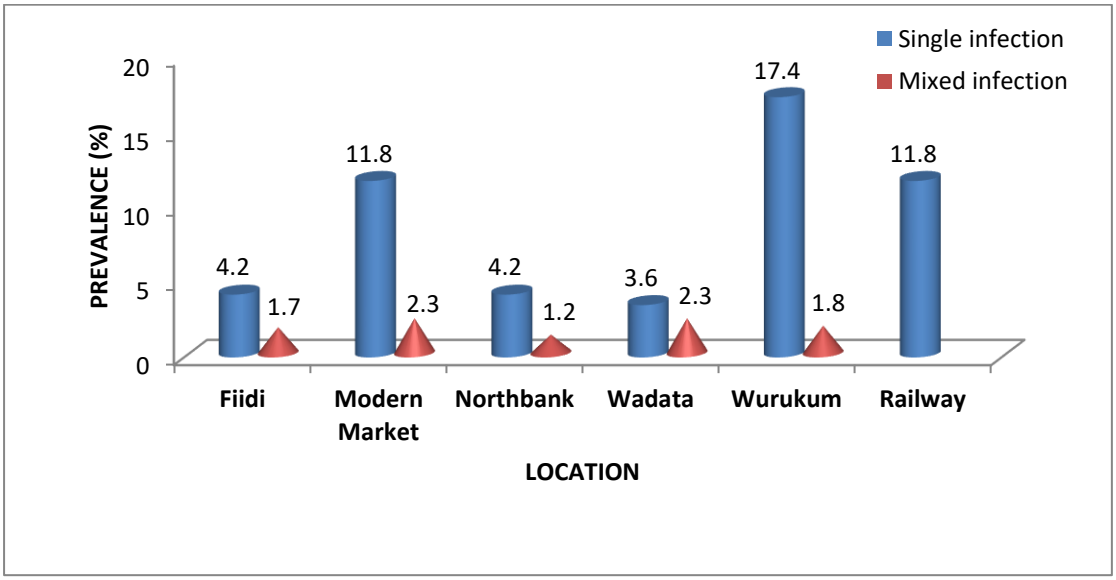

Figure 2: Prevalence of single and mixed infections of gastrointestinal parasites in pigs in relation to sampled locations

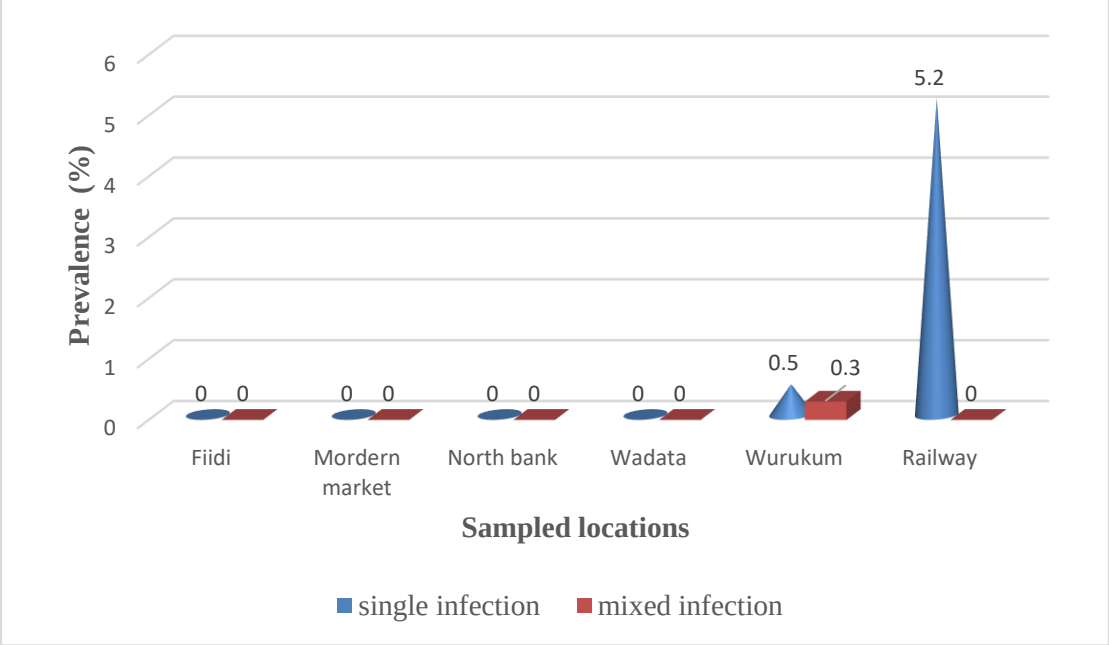

Figure 3: Prevalence of single and mixed infections with haemoparasites in relation to sampled locations

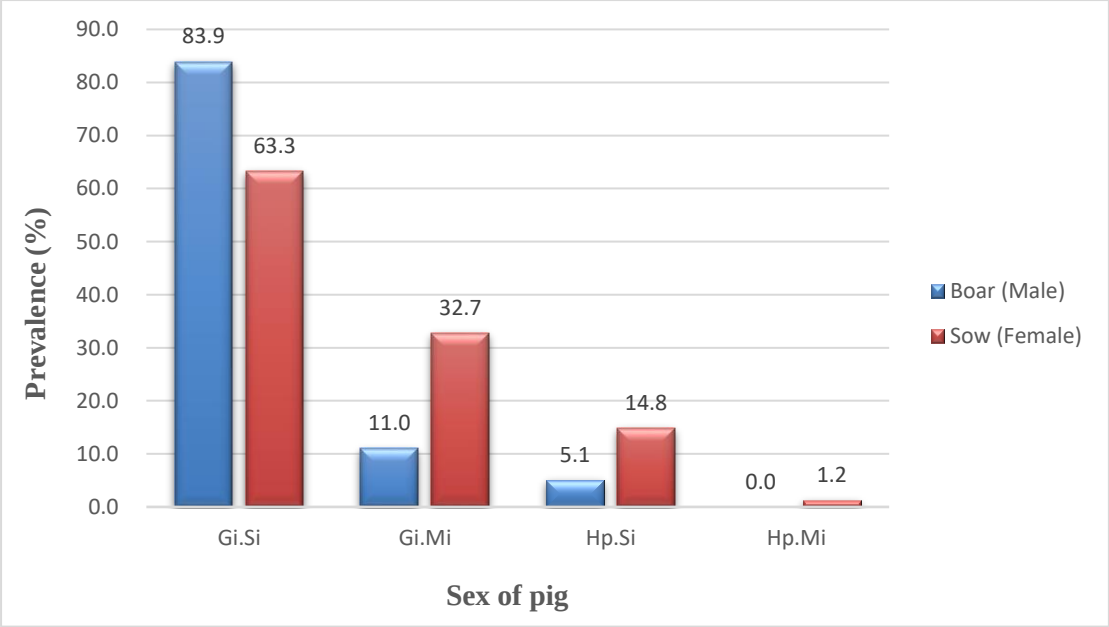

Figure 4: Sex-wise distribution of gastrointestinal and haemoparasites infections in pigs studied
*(Gi.Si & Gi.Mi – single and mixed infections with gastrointestinal parasites; Hp.Si & Hp.Mi – single and mixed infections with haemoparasites)

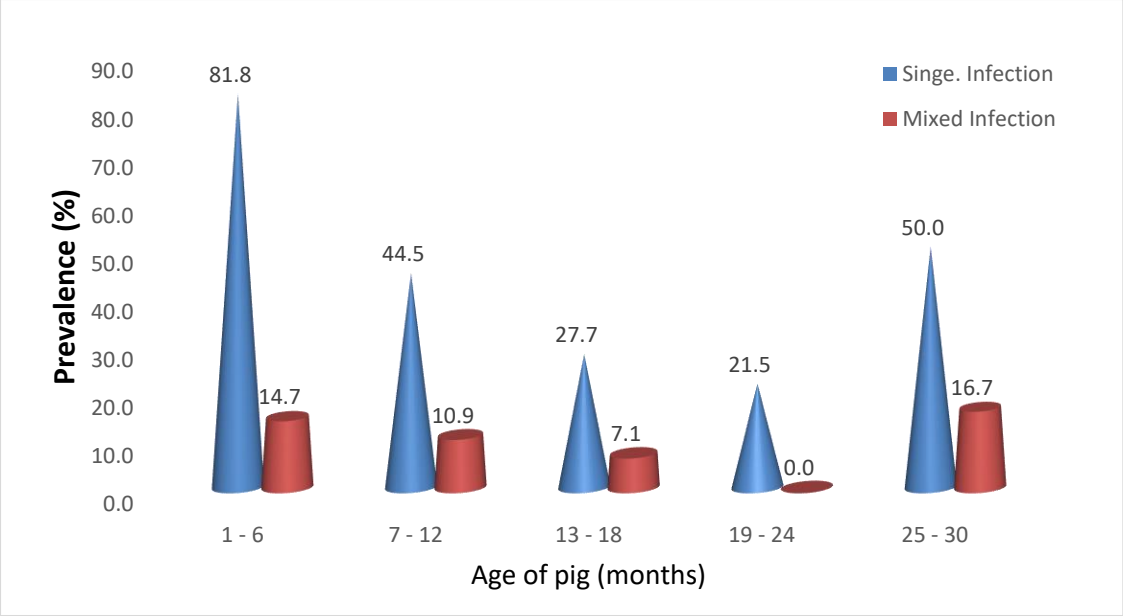

Figure 5: Prevalence of single and mixed infections with gastrointestinal parasites across various age groups

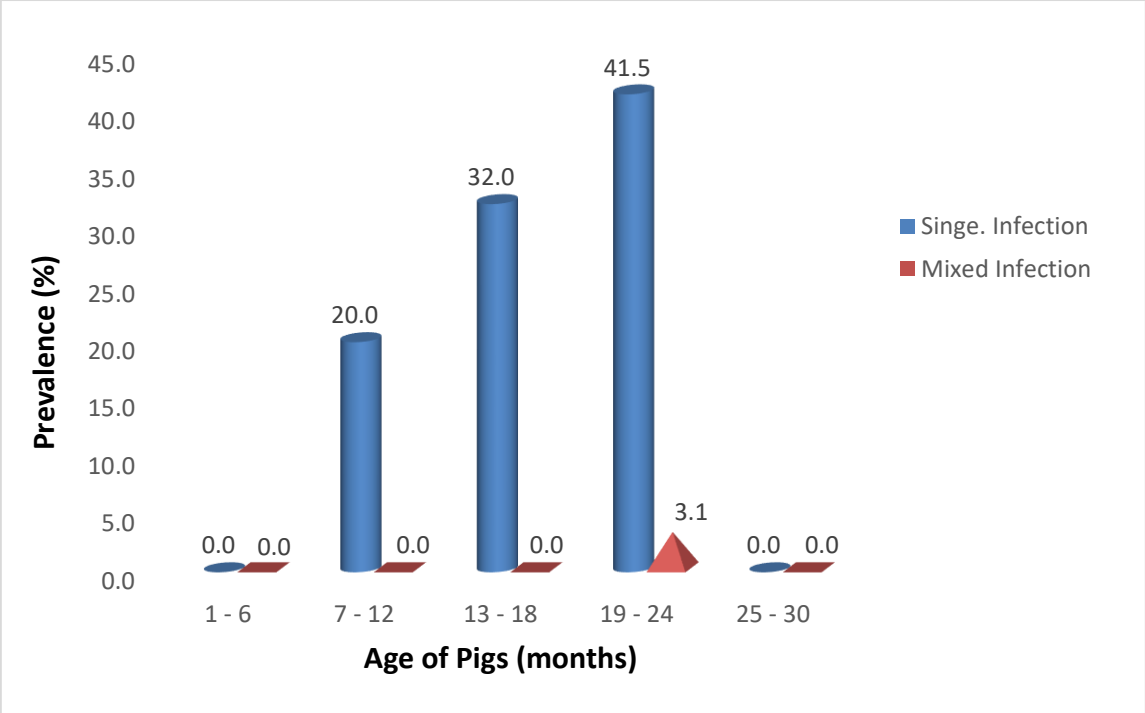

Figure 6: Prevalence of single and mixed infections with haemoparasites across various age groups

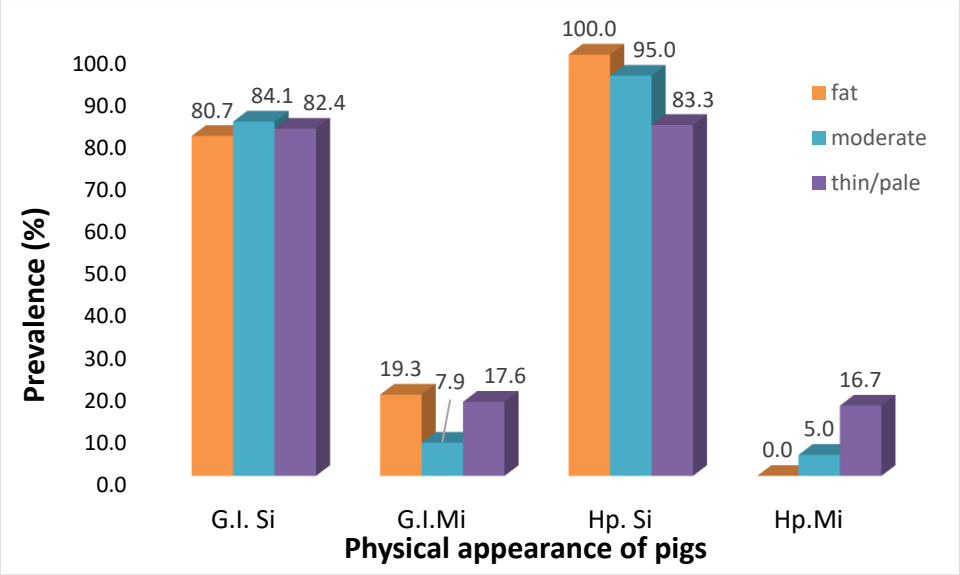

Figure 7: Prevalence of gastrointestinal and haemoparasites of pigs in relation to physical appearance of pigs. *(G.I.Si & G.I.Mi – single and mixed infections with gastrointestinal parasites; Hp.Si & Hp.Mi – single and mixed infections with haemoparasites)

DISCUSSION

Parasites have been associated with pigs in many parts of Nigeria and the world at large. Similar studies have corroborated the prevalence of gastro-intestinal and haemoparasites recovered in this study [7, 13, 16, 17]. Although contrary finding has been documented by Mahmuda and Usman [18] who reported *Eimeria* and *Strongyles* but haemoparasites were not recorded in pigs in Kebbi State. Generally, in Nigeria, piggery management systems are often semi-intensive and this encourages their exposure to parasitic infections.

A total of seven gastrointestinal parasites were identified in the study of which *Ascaris suum* (24.3%) had the most occurrence. Similarly, Sachin *et al.* [19] documented *A. suum* (32.59%) as the most prevalent gastrointestinal parasite in pigs of Mumbai region. Contrarily, Sowemimo *et al.* [20] reported *Trichuris suis* as having the highest occurrence in pigs studied in Ibadan, Southwest Nigeria. *A. suum* has been identified as the most common parasite in modern piggery operations with approximately 70 – 80 % of pigs infected [13]. Its abundance in pigs as indicated in this study could be attributed to aspects the biology of the parasite where a single female can lay up to about 1 million eggs in a day that can remain viable in the environment for up to 30 years, thereby ensuring the continuity of the parasite.

In this study, haemoparasites were recorded in 6.0% of the study population. In recent studies within Makurdi, Benue State, Ogbaje *et al.* [21] reported a prevalence of 7.98% while Jatfa *et al.* [17] documented a higher prevalence of 48.00% and 33.58% in pigs raised using extensive and intensive management systems, respectively. Different haemoparasite prevalence have also been reported from Nsukka (51.70%), Plateau (36.84%) and Ibadan (4.92%) [7, 13, 22]. The disparity in infection prevalence in this study as compared to others can be attributed factors such as sample size, laboratory methodology, geographical locations and periods of sample collection, as well as rearing system of the pigs sampled.

The prevalence of haemoparasites of pigs studied identified 2 parasites (*Babesia* and *Mycoplasma* species), with *Mycoplasma* spp being the most prevalent. This differs from the findings of Ogbaje *et al.* [21] who reported *Eperythrozoon* spp (31.9%) as the most common haemoparasite of pigs in Makurdi, Benue State. The presence of *Babesia* species recorded in this study agrees with the findings of Jafta *et al.* [17], Ogbaje *et al.* [21]. Kahn [23] also confirmed the parasite as a cause of severe diseases of pigs in Africa and Europe. The difference in occurrence of haemoparasites in this study as compared to other studies could be attributed to vector transmission potential and parasite densities. Also, the low prevalence recorded could be due to harsh environmental conditions on the arthropod vector responsible for transmission [23]. Ademola and Onyiche [22] suggests that regular use of chemoprophylaxis and acaricides can reduce haemoparasite infection in pigs.

Cumulatively, sows are more infected with both forms of parasites compared to boars. Female pigs are kept for longer periods due to their reproductive potential while the males most times fattened and sold off [20]. Prolonged rearing periods coupled with decreased immunity during gestation period may contribute to higher parasitoses in females than male pigs.

The mixed infection of helminths in pigs observed in this study suggests that they could be suffering from Parasitic Gastroenteritis complex (PGE) as documented by Gagman *et al*. [16]. The mode of locomotion by these nematodes causes damages to the hosts' internal organs, resulting in scar lesions that can be infected by Mycoplasma bacteria documented in this study. Younger pigs (1 to 6 moths) were the most affected by the parasites: This corroborates Eyo *et al.* [13]. This outcome could be due to lack of immunity as older pigs acquire immunity from pre-exposure and their mode of feeding. Other studies have recorded higher infection rates in older pigs than young ones [1].

There was difference in the percentages of both forms of haemo and gastrointestinal parasite infection in the studied locations. This disagrees with reports of Pam *et al*. [7] who reported no meaningful differences in the percentage rate of infections in two districts in Langtang, Plateau State. This study enrolled samples collected from abattoirs hence data regarding agro-ecology, piggery management as well as veterinary attention were not documented. These could be responsible for the disparity in infection prevalence across the locations.

Research has indicated that farming system as well as differences in the basic biological requirements of the pre-infective developmental stages, together with differences in transmission characteristics and immunogenicity of the different worm species are major epidemiological determinant of Gastrointestinal Parasitism (GIP) in pigs [24].

CONCLUSION

The results of this study show that 6.0% and 56.3% of pigs slaughtered in Makurdi abattoirs were infected with haemo and gastrointestinal parasites, respectively. 9 parasites, occurring as single and/or mixed infections were also recorded. The effect of these parasites may include increased susceptibility to other infections, retarded growth of piglets, delayed maturity, weight loss etc. These if overlooked can collectively culminate in production losses as well as zoonosis. Therefore, this calls for collaborative efforts of human and veterinary parasitologists to mitigate against the effects of pig parasitoses on human and animal health.

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