Prevalence and associated factors of gastrointestinal helminths in intensively managed Pigs in Ibadan, Oyo State, Nigeria

**Summary**

Gastrointestinal (GI) helminths infection is a major limiting factor of pig production, which poses a public health challenge and increases cost of production. There are also problems in the diagnosis and effective health management of pigs in Nigeria. A cross sectional study of 10 different pig farms was carried out in Ibadan to determine the prevalence of GI helminths infection and the associated factors. The breed, age, sex and body condition score of each screened pig were documented. Faecal sample was collected directly from the rectum and processed with MiniFLOTAC method, using zinc sulphate floatation solution. Two hundred and seventy-five (275) pigs were screened and 73 (26.5%) were positive for GI helminths, namely: *Strongyles* spp, *Strongyloides ransomi*, *Ascaris suum* and *Trichuris suis*. Statistical significance taking p-value to be < 0.05 was observed between overall GI helminths prevalence and (farm, age) while GI helminths prevalence was not significantly (p>0.05) related to breed, sex and body condition score. The prevalence of GI helminths in pigs obtained in this study provides an updated information on the status of GI helminths in pigs raised in Ibadan. It is therefore necessary that concerted and focused effort on the part of the farmers and the government be made to completely stamp out GI helminths disease completely in pigs.

**Keywords:** Gastrointestinal helminths, pig, prevalence, Ibadan,

**Running title:** Prevalence of Gastrointestinal Parasites in Pigs

**1. INTRODUCTION**

Pigs grow very fast with high fecundity rates and short generation intervals that result in quick generation of cash for farmers (ILRI, 2011). Infections of pigs with gastrointestinal helminths can limit production output, increase production costs, and pose zoonotic risks. Gastrointestinal (GI) helminths are ubiquitous with various pathogenic generathat are responsible for morbidity and mortality in livestock (Larsson et al., 2011; Thumbi et al., 2013). GI helminths is one of the major constraints mitigating against the sustainable development of the swine industry (Aliaga-Leyton et al., 2011).

Gastrointestinal parasitism in swine affect production performance in terms of efficient feed conversion, poor growth rate and reduced weight gain (Nsoso et al., 2000). In addition, swine GI parasites can lead to economic losses due to condemnation of organs in slaughter houses and decrease in carcass yield (Stephenson et al., 1980; Hale et al., 1985). Pigs can equally harbour zoonotic parasites that can act as potential source of human health hazards (Chawhan et al., 2014). Prevalence estimates of gastrointestinal parasites in pigs have been carried out in the abattoir and a localized setting in Ibadan (Sowemimo et al., 2012; Okorafor et al., 2014). This current study was therefore targeted to cover a wider range of pig farms across Ibadan metropolis in order to re-assess the prevalence of gastro intestinal parasites of pigs in Ibadan using a herd-based approach.

**2. MATERIALS AND METHODS**

**Study area**

Ibadan is the largest indigenous city in tropical Nigeria and it lies within longitude 007°2′ and 007°40′E and latitude 03°35′ and 4°10′N. Ibadan is 128km Northeast of Lagos and 345 km Southwest of Abuja, the Federal Capital (Udo, 1994).

**Faecal sample collection**

Faecal samples were randomly collected from 275 pigs from10 different intensively managed pig farms between the months of June and August, 2018. Faecal sample was collected directly from the rectum with hand glove into properly labelled clean and sterile universal bottles. Samples were collected and kept in cool boxes packed with ice and was transported to the Laboratory, Department of Veterinary Medicine, University of Ibadan for processing and analysis. Pigs whose samples were taken were identified using body condition score, sex, age, breed and farm location.

**Laboratory Procedure**

The faecal samples were processed using MINIFLOTAC® method. Two grams of fresh faeces were put into the Fill-FLOTAC® container using the calibrated cone in the kit and 18 ml of floatation solution (Zinc sulphate) was added (dilution ratio = 1:10). The suspension was then thoroughly homogenized using the rod of the Fill-FLOTAC. The faecal suspension was then filtered through the Fill-FLOTAC®, and used to fill the two chambers of the MINIFLOTAC® reading disk. The reading disk was allowed to stand for 10 minutes for parasite elements to float before translating the reading disk. After 10 minutes, the top parts of flotation chambers were translated and were read under a light microscope at a 100x magnification (Cringoli et al*.,* 2017), microscopic photos were taken.

**Data analysis**

SPSS version 23.0 was used for statistical analysis. Association between GI helminths prevalence and the factors (farms, breed, age, sex and body condition score) was analyzed by Chi square test. Value of p < 0.05 was considered to be statistically significant.

**3. RESULTS**

275 pigs were randomly selected for faecal analysis from 10 different pig farms practicing intensive management system. 226 were male while the remaining 49 were female, four breeds were examined; Indigenous breed (31), Large white (204), Hamshire (12) and Duroc (28). The age groups examined were adult (127), grower (123) and weaner (25). The body condition score was classified into three: lean (23), moderate (196) and good (56) as previously described by Adedipe et al. (2014).

Out of the 275 pigs examined for gastrointestinal helminthic infection, 73 pigs were found to be infected with one or more GI helminths, giving an overall prevalence of 26.5%. Four types of gastrointestinal parasites were identified, all nematode; *Strongyles* spp (Fig 1), *Strongyloides ransomi* (Fig 2), *Ascaris suum* (Fig 3) and *Trichuris suis* (Fig 4).

Statistical significance (P=0.000) was recorded between the prevalence of GI helminths and different farms (Table 1), with farm E recording the highest prevalence and farm G free of infection. An analysis of association between prevalence of GI helminths and different age groups (Table 2) revealed a significance of p-value = 0.016 with adult pigs having the highest prevalence of 34.65%, grower (18.70%) and weaned pigs having the least prevalence of 4.80%. There was no significant association (p>0.05) recorded between GI helminthes and other variables (breed, sex and BCS).

**4. DISCUSSIONS**

Out of the 275 pigs examined for gastrointestinal helminthic infection, 73 pigs were found to be infected with one or more GI helminths, giving an overall prevalence of 26.5%. This prevalence is higher than 25% that was reported in Ethiopia (Jufare et al., 2015) but lower than both 35.8% reported by Sowemimo et al. (2012) and 32.67% reported by Okorafor et al. (2014) in Ibadan, Nigeria, also 58.7% reported in Zimbabwe (Marufu et al, 2008). The prevalence recorded in this study could be as a result of difference in farm management practices, nutritional and health status of the pigs.

The nematodes identified are a little different from previous studies by Okorafor et al, (2014) that reported Oesophagostomum and Metastrongylus and Sowemimo et al. (2012) that reported Stephanurus and human hookwoom which were nor observed in this study. However, *Trichuris suis*, which was reported in this study was equally reported by both Okorafor et al. (2014) and Sowemimo et al. (2012). The slight difference could be as a result of different technique of faecal processing and the salt used.

The statistical significant association between GI helminthes and different farms sampled could be attributed to the fact that farm G dewormed the pigs on its farm two weeks before the faecal sample collection unlike the other farms that had spent more than a month after deworming before the faecal analysis. Adult pigs have the highest prevalence followed by growers and the least prevalence was recorded among weaners. This is in agreement with study carried out by Jufare et al, (2015) in Ethiopia Atawalna et al. (2016) in Ghana and Akanni et al. (2017) in Jos, Plateau State but disagrees with Sowemino et al. (2012) and Nwafor et al. (2019) reports of high GI helminths prevalence in piglets in Ibadan, Nigeria and Central Free State Province, South Africa respectively. This study found that age has a significant association on the prevalence of GI helminths.

Some parasites of pigs have the potential to infect humans, hence their public health importance (Olso and Guselle, 2000). *Ascaris suum,* one of the helminths identified in the course of this study has the capacity to lower the growth rate in young pigs. Ascariasis in humans is primarily caused by *Ascaris lumbricoides* and occasionally by *A. suum* (Barriga, 1982). It is assumed that a significant proportion of respiratory illnesses observed in people that have contact with pigs is caused by *A. suum* as well as by *A. lumbricoides* (WHO, 1967).

**5. CONCLUSION**

The prevalence of GI helminths obtained from this study is an indicator that the faeces of pigs can be a source of disease transmission. Also, the identification of *Ascaris suum* a helminths of public health importance, with pig as the main reservoir is a cause for concern. It is therefore pertinent to intensify proper preventive and control measures in terms of husbandry practices and routine deworming of pigs. Effort should equally be made to ensure that pig farmers get maximum profit from their labour and that the general public is also protected from diseases that originate from infected pigs. This can be achieved by increasing public awareness and improvement of veterinary care.

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