PRELIMINARY STUDY ON THE PREVALENCE OF GASTROINTESTINAL PARASITES OF PIGS MANAGED AND SLAUGHTERED IN UMUAHIA NORTH LOCAL GOVERNMENT AREA OF ABIA STATE, NIGERIA

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ABSTRACT

A study of gastrointestinal parasites of pigs was studied to identify and estimate the burden of parasites of pigs managed and slaughtered in Umuahia North LGA of Abia State, Nigeria between April to June, 2017. Faecal samples from freshly passed faeces and from the rectum of 150 pigs were collected randomly from two pig farms and three slaughter houses and analyzed in the laboratory using the formal-ether sedimentation method. Microscopic examination was done using x10 and x40 objectives. Out of the 150 faecal samples collected from 92 females and 58 males, 36(24 %) and 28(18.7 %) were infected respectively giving a total prevalence of 64(42.7 %). Chi-square analysis showed that the prevalence was not sex dependent (p>0.05). Eight parasites species were observed; Ascaris suum (14.7 %), Balantidium coli (9.3 %), Taenia solium (1.3 %), Trichuris suis (0.7 %), Entamoeba sp. (0.7 %), Strongyloides sp. (2.0 %), Oesophagostomum sp. (2.7%) and Globocephalus sp. (11.3 %). A. suum was the most prevalent parasite. The prevalence of gastrointestinal parasites was higher in adult pigs (≥12 months) (26.0 %) when compared to the growers (7 – 12 months) (10.0 %) and piglets (<7 months) (6.7 %). The prevalence recorded in this study was age dependent (p<0.05). Proper management of pigs in both farms and slaughterhouses should encourage enhancing productivity, maximizing profit and reduce the rate of infection among people eating pork. Pork should not be exposed to flies when slaughtered and must be cooked thoroughly before consumption.

Keywords: Pigs, Gastrointestinal parasites, Farms, Slaughterhouses, Umuahia North

INTRODUCTION

Pigs are one of the abundant livestock in Nigeria (Olaniyi, 2014). They are known as swine which have been domesticated as a source of food and leather since ancient times and are known to harbour a range of parasites that can be transmitted to humans (Dadas *et al.,* 2016). They equally serve as a cash reserve and a form of saving for rural population (Jegede *et al.*, 2013). They are omnivores, scavengers and have been known to eat any kind of food, including dead insects, plants bark, rotting carcasses, garbage and even other pigs in the wild (Pam *et al.*, 2013). Occasionally in captivity, pigs may eat their own young, often if they become very severely stressed (Pam *et al.*, 2013).

Pigs are one of the most common livestock raised in Nigeria with much potential

for economic development (Sowemimo *et al*., 2012; Pam *et al*., 2013). Domesticated pigs are commonly reared as livestock by farmers for meat as well as leather in Nigeria. Pork is consumed more than any other meat in the world (Pam *et al*., 2013). Pig production alleviates animal protein deficiency and considered a tool to fight poverty in the tropics (Jufare *et al*., 2015)**.** Pig production growth in Nigeria plays an important role in contributing to national growth domestic product and general economic growth by providing an additional protein source for human consumption, generating employment and reducing poverty (Adebisi, 2008), providing manure for fertilizing the soil, particularly for farmers that practice mixed farming (Geresu *et al*., 2015). The pig industry has continued to grow very rapidly in the Nigeria due to the fact that pigs have high fecundity, short generation interval, early maturity and relatively small space requirement for their production, making them viable sources of both improved nutritional and economic benefits to the farmers (Sowemimo *et al*., 2012; Olaniyi, 2014). The piggery livestock industry in Nigeria is saddled with religious, cultural, social and environmental challenges as well as infectious diseases (Mutua *et al*., 2007; Tomass *et al*., 2013).

Gastrointestinal parasites are prevalent in Africa, where climatic and other environmental factors provide perfect conditions for their survival and development (Perry *et al*., 2002). Most gastrointestinal parasites of pigs are helminths, they inhabit the gastrointestinal tract of their host which transverse the mouth, oesophagus, stomach, small intestine, large intestine and the rectum (Barbosa *et al*., 2015). Parasites of pigs and their potential to infect humans have recently become major issue among the public because of reported outbreaks of parasitic diseases such as *Giardia lambia* and *Cryptosporidium* spp*.* (Olson and Guselle, 2000). Pigs that are heavily parasitized are much more prone to diseases, which is a major cause of zoonosis and economic loss. Swine raised in intensive system of management are less prone to gastrointestinal infection, however, the large roundworm (*Ascaris* spp.), whipworm (*Trichuris* spp.) and the nodular worms (*Oesophagostomum* spp.) are often found in such condition (Sangeeta *et al*., 2002; Eijek and Borgsteede, 2005; Weng *et al*., 2005). Some of the gastrointestinal tract parasites of pigs result in damaging of organs or entire carcasses causing economic losses in pork industry (Tomass *et al*., 2013). In addition, pigs infected with GIT parasites may act as source of zoonosis through contaminating the environment with infective stages of intestinal parasites present in their excreta. The prevalence of gastrointestinal parasites of pigs may further be complicated when some of the parasites infect man (Tomass *et al*., 2013). Among GIT parasites, helminths are major health problem to those swine grazing on pasture. The common helminth parasites of swine are *Ascaris, Trichuris, Oesophagostomum, Trichinella* and *Strongyloides* species (Dadas *et al*., 2016). Losses of production ranges from stunted growth, prolonged fertility to reduced productivity (Jufare *et al*., 2015; Mutua *et al*., 2007). This study was done to identify, estimate and evaluate the gastrointestinal parasites of pigs slaughtered and managed in Umuahia North L. G. A. of Abia State, Nigeria

MATERIALS AND METHODS

Study Area: The study was conducted in Umuahia North LGA, Abia State, Nigeria (Longitude 5^0 32'14.8" N Latitude 7^0 29' 50.3" E) (Wikimapia, 2010). Umoriehi farm, Azikiwe road farm, Azikiwe road Slaughter, Agafai Slaughter and Bende road Slaughter were used for the survey. There are substantial inhabitants within Umuahia North LGA where pigs are commercially managed in farms and slaughtered for meat.

Faecal Samples Collection and Preservation: Faecal samples were randomly collected from 150 pigs using a long forceps into a clean 30 ml sterile bottles labeled with the approximate age of pig, sex and location of collection. The collection of the faecal samples took place from April to July, 2017. The faecal samples were collected from the rectum of the slaughtered pigs and freshly passed faeces of pig in the farms and were transported to the

Parasitology Laboratory of the Department of Zoology and Environmental Biology, Michael Okpara University of Agriculture, Umudike, where they were preserved with 10 % formalin before processing.

Laboratory Procedure: The collected samples were analyzed in the laboratory using the formalin-ether sedimentation method to identify the gastrointestinal parasites present in the faecal samples of the pigs. The sedimentation technique was used to recover eggs of intestinal helminths which do not float well in sodium chloride solution/zinc sulphate. One gram of faeces was collected and placed into 8 ml of 10 % formalin solution in a screw capped bottle and shaken vigorously to mix then filtered with a sieve into a centrifuge tube with the aid of a funnel. Four milliliter of ethyl acetate was added to the supernatant and the centrifuge tube was covered and mixed vigorously for 1 minute. It was then centrifuged at 3000 rpm for 1 minute. An applicator stick was used to loosen the layer of faecal debris from the side of the tube. The tube was inverted to discard the ether, faecal debris and formalin solution while the sediment will remain. The bottom of the tube was tapped to suspend the sediment and a drop of the sediment was placed on cleaned greased free glass slide with the aid of a dropping pipette and covered with cover slip. It was examined microscopically using x 10 and x 40 objectives. Parasites eggs were identified by using identification keys based on their morphological features (FAO, 1998).

Statistical Analysis: Differences in prevalence of parasite infection between age groups and sex were tested by chi-squared ($\chi 2$) tests. Results presented using frequency and percentages.

RESULTS

Out of 150 pigs from two farms and three slaughterhouses examined, 64(42.7 %) pigs were infected (Table 1). In Umuoriehi farm and Azikiwe road farm, 48 and 45 pigs were examined with 17(11.3 %) and 19(12.7 %) pigs infected respectively (Table 1). Infection recorded in the different slaughter houses; Azikiwe road slaughter, Agafai slaughter and Bende road slaughter were 10(6.7 %), 10(6.7 %) and 8(5.3 %) respectively (Table 1). Chi-square analysis showed that this prevalence was not influenced by the source of the pigs ($p>0.05$). Sex percentage prevalence of the infection recorded were 36 (24%) for females against 28 (18.7%) for the males (Table 2). Eight parasites were identified; *Ascaris suum* (14.7 %), *Balantidium coli* (9.3 %), *Taenia solium* (1.3 %), *Trichuris suis* (0.7 %), *Entamoeba* sp. (0.7 %), *Strongyloides ransomi* (2.0 %), *Oesophagostomum* sp. (2.7 %) and *Globocephalus* sp. (11.3 %) (Table 2). Infection was also found to be higher in adults (≥12 months) (26.0 %) when compared to the growers (7 – 12 months) (10.0 %) and piglets (<7 months) (6.7 %) (Table 3). Chi-square analysis showed that the overall prevalence recorded in this study was influenced by age ($p<0.05$).

DISCUSSION

This study recorded an overall prevalence of 42.7 % infection among the managed and slaughtered pigs at Umuahia North LGA, Abia State, Nigeria. This was in agreement with the study of Sowemimo *et al*. (2012) who reported 35.8 % prevalence in Ibadan and Wosu (2015) who reported 24.10 % in intensively managed pigs in Nsukka, but in disagreement with the 100 % reported by Eyo *et al.* (2014) in pigs slaughtered for meat in Nsukka and Nwoha and Ekwurike (2011) in intensively managed pigs of different ages in Umuahia, Abia State. The lower prevalence of gastrointestinal parasites recorded in this study could be as a result of effective management system at the farms and slaughterhouses, such as daily cleaning and disinfection of pens, giving high quality commercial feed and the use of effective anthelmintic drugs at the right time.

Eight species of gastrointestinal parasites were encountered in this study compared to seven species reported by Nwoha and Ekwurike (2011) in Umuahia and three reported by Eyo *et al*. (2014) in Nsukka. *Ascaris suum* was the most prevalent parasite recorded

in this study. This could be as a result of the female parasitic worms of *A. suum* been highly fecund and are capable of producing hundreds of thousands of eggs per day that contaminate the surroundings instantaneously and also their eggs are generally considered to be highly

Table 1: Preliminary prevalence of gastrointestinal parasites of pigs managed and slaughtered in Umuahia North Local Government Area of Abia State, Nigeria

Source	Number Examined	Number Infected	Percentage
Umuoriehi farm	48	17	11.3
Azikiwe farm	45	19	12.7
Azikiwe Slaughter	22	10	6.7
Agafai slaughter	18	10	6.7
Bende road slaughter	17	8	5.3
Total	150	64	42.7

Table 2: Preliminary prevalence of gastrointestinal parasite species based on sex of pigs managed and slaughtered in Umuahia North Local Government Area of Abia State, Nigeria

Parasite Species	Female infected	Male infected	Total
Ascaris suum	15	7	22 (14.7)
Balantidium coli	4	10	14 (9.3)
Taenia solium	0	2	2 (1.3)
***Entamoeba* sp.**	0	1	1 (0.7)
Trichuris suis	1	0	1 (0.7)
***Globocephalus* sp.**	10	7	17 (11.3)
***Strongyloides* sp.**	2	1	3 (2)
***Oesophagostomum* sp.**	4	0	4 (2.7)
Total	36(24.0)	28(18.7)	64 (42.7)

Table 3: Age related prevalence of gastrointestinal parasites of pigs managed and slaughtered in Umuahia North Local Government Area of Abia State, Nigeria

Parasite Species	Piglets (<7 Months Old)	Grower (7 – 12 Months Old)	Adult (≥1 Year)	Total
Ascaris suum	5	4	13	22(14.7)
Balantidium coli	2	3	9	14(9.3)
Taenia solium	1	1	0	2(1.3)
***Entamoeba* sp.**	0	1	0	1(0.7)
Trichuris suis	1	0	0	1(0.7)
***Globocephalus* sp.**	1	3	13	17(11.3)
***Strongyloides* sp.**	0	1	2	3(2)
***Oesophagostomum* sp.**	0	2	2	4(2.7)
Total	**10(6.7)**	**15(10.0)**	**39(26.0)**	**64(42.7)**

resistant to external environmental factors suggesting their possible survival for up to several years in the appropriate conditions. This was in agreement with the findings of Tamboura *et al*. (2006) that reported *A. suum* as the most prevalent parasite in scavenging pigs and in semi-intensively managed pigs but contradicted the findings of Eyo *et al*. (2014) that among the endoparasites, *Eimeria* sp. had the highest prevalence (51.70 %), followed by *S. ransomi* (41.10 %) and *A. suum* (31.10 %) in Nsukka. The prevalence was higher among the sows (24 %) than the boars (18.7 %) and this agreed with the finding of Dey *et al*. (2014) who recorded a higher prevalence of endoparasites in sows (100 %) than boars (93.9 %). However, it was in disagreement with the works of Dadas *et al*. (2016) and Sowemimo *et al.* (2012) that

reported higher prevalence among boars (28.15 % and 18.0 %) than in sows (22.96 % and 7.0 %) respectively. The higher prevalence among the sows in this study could be attributed to the higher level of lactation and progesterone hormones make the female individual more susceptible to any infection (Lloyd, 1983). Infection was also found to be higher in older pigs or equal to 12 months (26 %) when compared to the grower (7 - <12 months) (10%) and piglets (<7 months) (6.7 %). This was in agreement with the study of Dey *et al*. (2014) who recorded 100 % in adults, 100 % in growers and 90.5 % in piglets and in disagreement with the study of Sarker *et al*. (2016) who recorded 100 % in the adult, grower and piglets. Higher infection in the older pigs recorded in this study could be because of the older animals picking up more infection over time than in younger animals and the feeding habit of the adult.

Conclusion: The result of this study has revealed that pigs could be an important source for some parasites capable of infecting humans. Parasites control will play a major role in increasing the productivity of pigs reared in Umuahia North Local Government Area of Abia State, Nigeria. This study provides additional information that may be useful in planning a proper control program for gastrointestinal parasites of pig, thereby providing hygienic and disease free pork for public consumption. Based on the findings of this research, proper management of pigs both in farms and slaughter houses should be enhanced in order to increase productivity, maximize profit and reduce the rate of infection among people eating pork. Pork inspection practices should be enforced by all stakeholders in the public health industry and pork should not be exposed to flies when slaughtered and must be cooked thoroughly before consumption by individuals.

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