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SURVEY ON THE OCCURRENCE OF PORCINE HELMINTHOSIS IN SMALLHOLDER PIGS REARED IN WUKARI SOUTHERN SENATORIAL ZONE, TARABA STATE, NORTH EASTERN NIGERIA

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ABSTRACT
The study was conducted to determine the occurrence of porcine helminthosis in Wukari Local Government area of Taraba state, North-eastern Nigeria. Samples were collected from 203 pigs comprising of both young and adults of all sexes. The overall prevalence was 33.83%. A simple percentage analysis was carried out to ascertain the infection rates of these parasites. There was no significant difference in prevalence of infection. There was however, a significant difference in infection by sex. Male pigs (48.28%) had lower prevalence than the sows (51.72%). The study has a lot of health implications on the residents of the study area, because, a large proportion of them depend on pork as their main animal protein source. In this study, the adult pigs are found to be infected with a percentage positive of (56.16%) compared to their young ones that recorded an occurrence of (43.84%).The results also portend great economic loss by the pig farmers, who are mostly peasants. In addition, the farmers stand the risk of infection with *A.suum*, cysticercosis and could also serve as carriers of cysts and eggs. There is therefore, an urgent need for health education on the zoonotic nature of the disease by veterinarians and other Public Health stakeholders in the study area.
Keywords: Porcine, Helminthosis, Occurrence

INTRODUCTION

Pigs are among the abundant livestock potential of Nigeria. Helminthosis are among the most devastating diseases of livestock; however, the diseases are often over looked because

clinical symptoms are rarely apparent, losses of production occur mainly from retarded growth, delayed fertility and productivity (Mutual et al., 2007).

The swine industry has witness an unprecedented increase in production and consumption over the past decade. This positive development means an increase in provision of animal protein for human consumption, employment generation, poverty reduction, contribution to the nation`s gross domestic product and general economic growth (Amuta et al., 2015). Swine industries in developing countries with particular reference to Nigeria is faced with a number of constrains among which are disease, religious believe, cultural and environmental factors (Fabiyi, 1979; Mutual et al., 2007).

Helminthosis lives within the host gastrointestinal tract, extending from the mouth through the esophagus, stomach, small and large intestine down to the rectum mainly helminth, but protozoan parasites also inhibit the gastrointestinal tract, (Junaidu and Adamu, 1997). Helminthosis are parasites responsible for substantial loss of productivity in swine and other livestock industries. They constitute a major impediment to efficient and profitable livestock production (Boes et al., 2000; Joachim et al., 2001). Gastrointestinal parasitism in swine affects swine performance in terms of efficient feed conversion, poor growth rate, reduced weight gain and the condemnation of affected organs after slaughter (Nsoso et al., 2000). In Nigeria livestock production sector is vital not only because of its economical benefits but because over 80% of the populations are involved in one way or the other in Agriculture (Otuma and Uchwa, 2009).

Swine internal parasite is estimated to cost 250 million dollars annually in the United State and are not considered to be swine killers. Internal parasites devitalize pigs by robbing them of essential nutrients and injuring vital organs (Mayer and Walker, 1999). Pigs heavily parasitized are more susceptible to disease, the resulting disease being major causes of zoonosis and economic loss. Primarily, raising pigs in pens enhances a better hygienic profile unlike when swine are raised outside pens, thus exposure of pigs outside suitable pens disposes them to the danger of parasitic infections and other related diseases. Hence man can be directly or indirectly affected. The application of raw livestock wastes in Agricultural soils is one of the most extended practices for residue management (Bornay et al., 2009)

However, there are diverse components in their composition especially pathogens, heavily metals and salts which are potentially dangerous for the environment and for man. Swine faeces are a source of pathogenic organisms, mainly bacteria, viruses, parasites and fungi. The most frequently found parasites in intensive hog farming are *Ascaris suum, Trichuris suis, Strongyla, Balantidium coli* and *Cryptosporidium spp* (Caballero-Hernendez et al., 2004).

Water-borne transmission of internal parasites has been linked to domestic livestock and farming practices. The danger for humans becoming infected with protozoa of animal origin is higher than with helminthes (Burton and Burner, 2003). *Cryptosporidium species* robust oocyst for example can survive for long period outside the host, particularly in moist environment. Mawdsley et al., (1996), *Cryptosporidium oocysts* can move through various soil type and Lindergard et al.,(2001)

said that in general, oocysts isolated from soil samples are regarded as being viable and potentially infective to humans. *Ascaris suum*, eggs were not destroyed when the solid fraction of swine manure was ensiled for 56 days (Caballero Hernandez et al., 2004), therefore could be dangerous in the feeding of the other animals. Control of parasitic infection of swine is aimed at reducing their detrimental effects. Management should be aimed at breaking the life cycle of these parasites as well as to prevent other diseases of swine. Helminthes parasite as a disease has received little or no attention in Nigeria especially the subclinical from which is mainly caused by Nematodes or Tapeworm. This present study was initiated with this background and consideration to determine the occurrence of porcine Helminthosis in Wukari Local Government area southern Taraba.

MATERIALS AND METHODS

Study Area

Wukari is a Local Government Area in Taraba state, Nigeria. Its headquarters is in the town of Wukari on the A4 highway. The Donga river flows through the area and the Benue River forms a boundary with Nasarawa State to the northwest. The town is base of the Wukari federation, a traditional state. It is the home to Jukun people as a major ethnic group of West Africa. The local languages are Wapan, Nyifon, Jibu. It has an area of 4,308km^2 and a population of 241,546 at the 2006 census. Blench (2019).

Sample Collection

The research was conducted between May and July 2020, by randomly examining 203 out of 600 pigs in Wukari Local Government Area, faecal sample were collected into polythene

bags directly from the rectum of each pig being sampled. Examination glove hands were used in faecal sample collections; the samples per pig were each placed in polythene bags and labeled for proper identification. The samples for corresponding pigs, as well as the breed and sex were also recorded. Samples were preserved in a refrigerator and were processed within 24 hours.

Sampling Techniques/Processing

Five hundred gram (500g) of sugar and 400g of sodium chloride was dissolved in 1,000mls of distilled water and the mixture was stored at 20°c. 3 gram of the feacal samples was poured into a mortar and about 30mls of cheater solution was added into the mortar and emulsified using the pestle. The mixture was sieved, the supernatant were discarded. The filtrate was poured into a test tube to fill up to the meniscus level which ensured that there was no air bubbles, the test tube was covered with a clean cover slip and was allowed to stand for fifteen (15) minutes in order to allow the nematodes eggs to float to the surface of the cover slip. The cover slip was removed and covered on the sterile glass slide and the slide was mounted on a microscope and examined under X100 magnification for demonstration of characteristic nematodes eggs. The results of the laboratory analyses were submitted to a descriptive analysis of the data. The results were tabulated according to the phase of occurrence.

RESULTS

Out of a total of 203 feacal samples collected from male, 98 were found to be positive for Helminthosis with a percentage prevalence of 48.28% while in female, 105 feacal samples were collected with a positive percentage of 51.72%. This is an

indication that the female's pigs were more susceptible than their male counterpart while base on their age group 114 feacal samples were collected from the adult with the percentage of 56.16% and the young pigs were 89 with a positive percentage of 43.84% respectively (Table 1).

Table 1: Occurrence of Porcine Helminthosis based on Age and sex

Age	**No. of pigs sampled**	**No. of pigs positive**	**percentage**
Adult (>1year)	220	114	56.16
Young (<1year)	380	89	43.84
Total	**600**	**203**	**33.83**
Sex	**No. of pigs sampled**	**No. of pigs positive**	**percentage**
Male	250	98	48.28
Female	350	105	51.72
Total	**600**	**203**	**33.83**

DISCUSSION

In animals affected by gastrointestinal parasites, losses in performance may occur, mainly because they favour the occurrence of secondary infections by opportunistic pathogens (Linhares et al., 2012). The economic losses associated with endoparasitic infections are due to reduction in feed efficiency, low number of piglets born, low weight of the offspring, low weight at weaning, reduce fertility and interference in the immune response to vaccines (Steahard et al., 2009). In addition, some of these pig helminths are zoonotic in nature and can infect humans. (FAO, 2008; Spencer, 2010). Pig production can be profitable by yielding rapid returns on capital investment to the farmers; hence, internal parasitism is one of the limiting factors that impact a profitable piggery enterprise (Nsoso et al., 2000).

In this study we investigated the occurrence of helminths in pigs raise by smallholder farmers in Wukari Local Government Area of Taraba state. There was an overall occurrence of (33.83%), similar overall oocurrence of intestinal parasites in pigs had been recorded in the central free state Kenya (79.2%),Korea Ismai et al., 2010 (73.4%), 92.7% Tambura et al, 2006 and 96.4% (Dey et al., 2014) was also reported in Kabale Distric, Uganda; Burkina Faso and Bangladesh, respectively. However, in this study the occurrence of helminths was higher than the results obtained in Ethiopia (25%) and lower than the one recorded in Zimbabwe(58.7%) by Jurare et al (2015) and Marufu et al (2008) respectively. These recorded results probably varied because of geographical and climatic conditions various breeds of pigs, farm management practices, the nutritional and health status of the pigs, methods of sample collection and analysis, and differences in the number of samples analysed. Therefore, adequate control measures should be implemented in order to prevent parasitic diseases in animals at the breeding sows, specifically breeding sows, Linhares et al., 2012), published guidelines for anthelmintic treatment in swine farms. These authers recommended that animals should be treated with anthelmintics 7 to 10 days before being transferred to gestation crates.

The results obtained in this study base on gender sensitivity, it is recorded that the female are having the higher rate of infection with 51.72% compared to their male counterpart with 48.28% respectively. This result is in agreement with the study carried out by Shitta and Ella (2013) that recorded a percentage positive of 84.0% in female as compared to their male counterpart with 72.28% in some selected parts of Jalingo metropolis. Shima et al (2014) reported that female

pigs excrete significant numbers of worm eggs in their feaces than the male. However, varied results for A.Suum had been recorded across a variety of locations, which may be because of seasonal and geographical variations that favour the proliferation of the helminths. To explain this phenomenom, Kagira (2010) and Obonyo et al (2012) argued that perpetual wet conditions, an unhygienic environment and favourable temperature can lead to high infection rates with A.Summ. The eggs can withstand adverse weather conditions and some chemicals, and they may remain viable and infective for extended periods (Roepstorff and Nensen, 1998). Polley amd Mostert (1980) found that a reduction in weight of upto 40% occurred in pigs infected with A.Suum and reduction of up to 25% occurred in feed conversion efficiency.

In this study, the adult pigs are found to be infected with a percentage positive of 56.16% compared to their young ones that recorded an occurrence of 43.84%. This work is not by any means in agreement with the work of Amuta et al (2015) who recorded 77.0% positive cases for the young ones in comparism with their counterpart the adult with 50.0%. shima et al (2014) also stated that, adult pigs are more likely to have accumulated the infections over time which enhances them to develop resistance against re-infections. The result varied with the findings of Nosal et al (2008) who reported that piglet acquired immunity through suckling of milk from their sows as such limit them from infestation with parasites. Ascaris was the most occurring (27.59%) of all the helminths recovered in this study. This result is higher than some previous studies by Jufare et al (2015), Marufu et al (2008), Nsoso et al (2000) and Obonyo et al (2012) who reported 2.9% in Ethiopia, 4.7% in Zimbabwe, 6.8% in Botswana and 7.8% in Kenya respectively.

However, the result is slightly similar to the 38% and 37.5% reported respectively in the West Indies (Tiwari et al., 2009) and in outdoor pigs in the Netherlands (Eijck and Borgsteede, 2005). The higher occurrence of Ascaris in this study might have been because of the poor management and husbandry practices that were observed on most of the farms that were visited. This study is in total agreement with the findings of Kumar et al (2002), Ngowi et al (2004), and Tamboura et al (2006) who reported that A.Suum was found to be the most prevalent parasites in scavenging pigs, more so, in semi-intensively managed pigs (Nsoso et al., 2010).

Trichuria trichuria, Acuria spiralis was recovered at an overall percentage of 13.79% and 13.79%, whereas *Strongylus spp* and *Stephanuris dentatus* were found to be 10.34% each. Similarly, Eijck and Borgsteede (2015) observed 25%, 27.2% and 22.2% of this worms on free range, organic and conventional farms in the Netherlands, respectively. Moreover, infestation was reported at 17% in Kenya, 17.6% in India and 7.6% also in Kenya by Kagira et al (2002), respectively. These results concur with the result obtained in this study. However, divergent results were obtained by Obonyo et al (2012), Tiwari et al (2009), Dey et al (2014), Marufu et al (2008) and Tambura et al (2006), who observed a prevalence of 74% in Kenya, 44% in Zimbabwe and 15.6% in Burkina Faso respectively. There discrepancis may have been partly because of seasonal and geographical variations, pig breed, health status and effective management practices or the lack thereof.

Although results were statistically significant ($P<0.05$), the close differences in the prevalence of intestinal parasites in both the intensive (73.1%), semi-intensive (82.4%) management

system could be linked to the poor sanitary and biosecurity measures that were observed on both farms types. In addition, pigs raised intensively were sometimes allowed to forage outside in times of feed scarcity or to alleviate their hunger during dry seasons. This must have exposed them to almost the same kind of gastrointestinal parasites and intensity of infection as the free rangers. This may account for the similar results in this category compared with reports from Homabay District, Kenya (Obonyo et al., 2012); Busia District Kenya (Kagira, 2010); and in Uganda (Nissen et al., 2011) were respectively prevalence of 83%, 84.2% and 91% were obtained for scavenging, free range or extensively raised pigs. The semi-intensive farms had a higher occurrence of all four gastrointestinal parasites when compared with the intensive farms. This findings supports previous reports such as the one by Liu and Lu (2002), who stated that the gastrointestinal parasite burden of intensively managed pigs is usually lower.

The double to triple mixed parasite infections detected was similar to that of an earlier report from Denmareie by Roepstorff and Jorsal (1989), and it also corroborate the findings of later studies in Burkina Faso (Tamboura et al., 2006), Nigeria (Sowemimo et al., 2012) and Ethiopia (Jarafe et al., 2015). There studies identified multiple (double – quartriple) mixed associations of intestinal parasites, thereby confirming the occurrence of polyparasitism in pigs that are exposed to the outdoors.

Table 2: Occurrence of Helminthosis of Pigs based on species of parasites

Species	No. of parasites	Percentage (%)
Stephanurus dentatus	3	10.34
Paragoninus westermanli	1	3.45
Strogylus Spp.	3	10.34
Acuria spiralis	4	13.79
Schistosoma Spp.	2	6.90
Ascaris	8	27.59
Triodontophurus Spp.	2	6.90
Trichuris trichuria	4	13.79
Gastrodicus aegypticus	2	6.90
Total	**29**	**100**
Co-infection		
Ascaridia spp. and *Schistosoma* spp.	3	21.43
Ascaridia spp. and *Trivhoris triduria*	2	14.29
Ascaridia spp. and *Stephanurus dentalus*	4	28.57
Ascaridia spp. and *Gastrodicus aegypticus*	5	35.71
Total	**14**	**100**

This result present different helminthes parasite infestation based on species of parasites with *Ascaris*, 27.59%, *Trichuris trichuria*, 13.79%, and *Acuria spiralis* 13.79% then followed by *Strongylus Spp* 10.34%, *.and Stephanurus dentatus* with 10.34% while the report of Sammy (2018) recorded 18.2%, 13.6% and 13.6% for *Ascaris*, *Trichuris trichuria* and *Strongylus spp* respectively in a work carried out in Ardo-kola same state but different locality. The variation in the occurrence remain unexplained; however, it could possibly suggest that difference in species occurrence could be attributed to locality, husbandry practices, bio-security protocol and feeding habits of the pigs in these localities.

CONCLUSION AND RECOMMENDATION

The study revealed a high occurrence of a wide range of species of gastrointestinal helminthes parasites that play a great role in confronting the health and welfare of pigs in the study area. The result also suggest the presence of favorable environmental condition for the survival, infection and perpetual of helminthes of pigs in the study area. Therefore,

i. Government should train more extension workers who will create awareness to the farmers on the danger of the disease.
ii. Farmers should maintain good hygienic practices and bio-security protocol in their farms.
iii. Farmers should regularly consult veterinary and livestock personnel for health and production issues.
iv. Quarantine of newly purchased pigs, isolation and identification of affected pigs and accination of healthy ones should be done.

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