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# GASTROINTESTINAL PARASITES OF INDIGENOUS PIGS (*SUS DOMESTICUS*) IN OBEAGU - UNO OF ENUGU SOUTH ENUGU STATE

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***Keywords:*** *Gastrointestinal Parasites, Prevalence, Prevention of Zoonotic Helminthiasis and Obeagu Uno.*

***Abstracts:*** *Intestinal parasites have a significant impact on productivity of pigs. Additionally, presence of zoonotic parasites in pig faeces used as fertilizer and ingestion of raw or undercooked pork products originated from parasite-infested pigs pose a risk to human health. The parasite challenges in pig production in Nigeria causes substantial reproductive losses, poor reproductive performance and production in swine industry. The study was to estimate the prevalence and diversity of gastrointestinal parasites of pigs at Obeagu Uno. About 164 faecal samples of pigs were collected, samples collected were evaluated microscopically for different prevalence of gastro intestinal parasites in pigs. A prevalence of 51.2 % was observed as overall species prevalence in the fecal samples analysed. Ascaris suum 13.4%, Trichuris spp 5.48%; Balantidium spp 10.4%; Blastocystis spp 6.70%, Strongyloides spp 8.53% and Oesophagostomum spp 6.70%. there is a need for combined efforts to control parasites infections for optimum production of pigs and prevention of zoonotic helminthiasis, hence, pigs harbour a higher prevalence and greater diversity of gastrointestinal parasites.*

## Introduction

Pigs *Sus Scrofa* popularly called pork meat serve as meat and sources of protein in different parts of the world. Pigs (*Sus scrofa domesticus*) have been domesticated and lived in the proximity of humans around 9000 years (Patra *et al*., 2019). In most region eating of pork meat is considered a taboo, while some region eat pork meat. Pork is consumed more than any other meat in the world (Nwafor *et al*., 2019). Pigs 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. Occasionally in captivity, pigs may eat their own young, often if they become very severely stressed (Nwafor *et al*., 2019). In other to fulfill dietary requirement to preserve fitness life, the rearing of pigs, and other different livestock to meet up with increase demand of

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meat in addition to its economic gains has lead increase pig farming in different part of Nigeria. In current years, the pig industry have improved with introduction of pass breed pigs and software of the pork meat in both city and rural regions. In pig farming, the right preventive and control measures against diseases has increased the reproductive overall performance, feed usage and decrease mortality and morbidity of illnesses. Amongst parasitic illnesses, the gastrointestinal parasites are chargeable for vast loss of productiveness in pigs in terms of inefficient feed conversion, negative boom price, and reduced weight benefit. The bad environmental hygiene and fallacious control is suggested as risk elements for gastrointestinal parasitic contamination in pigs and additionally the variety and depth of gastrointestinal parasitism depends on the styles of pig manufacturing gadget.

Pigs are one of the most common livestock raised in Nigeria with much potential or economic development (Sowemimo *et al*., 2012). It is also one of the fastest growing livestock farming in South East. Pig production alleviates animal protein deficiency and considered a tool to fight poverty in the tropics (Ismail *et al*., 2010). Porcine production has a high potential to contribute to economic gains as pigs have high fecundity, high feed conversion efficiency, early maturing, short gestation period, also multiparous and relatively small space requirement for piggery (. Rekwot *et al.,* 2003).

Gastrointestinal parasites have been noted as one of the major constraint to swine production. These parasites are found within the gastro intestinal tract (GIT) of the animals (Uysal *et al*., 2009). The three major groups of parasites which affect the gastro-intestinal tract of pigs are nematodes, trematodes and the intestinal protozoan (Sowemimo, *et al*., 2012). Extensive production system of pigs for commercial purpose is widely practiced in Africa, because of availability of cost free feeds (house hold municipal garbage) and possibilities for the animals to get better nutrition through scavenging (Petersen *et al*., 2015). Poor Environmental hygiene coupled with extensive management is reported as risk factors of infection of pigs with gastrointestinal parasites.

The internal parasites is also known to injure some vital organs which play key role in metabolic activities (Nissen, *et al*., 2010). The consequences are anorexia, poor growth rate, anaemia, emaciation, infertility and condemnation of affected organs after slaughter (Nsoso *et al*., 2000). Severe case of helminthiasis in young pigs has been reported and is commonly associated with diarrhea, loss of electrolytes and death (Stewart and Hoyt 2006). High morbidity and mortality associated with helminthes infection compromised the productivity and reproductive performance of pigs in Africa. (Nissen *et al.,* 2011). Some of this intestinal helminthes like nematode leaves in the intestines feeding on the gut lining and ingesting particulate and liquid digester therefore competing nutritional intake with pig. With this competition, adult parasite can lead to hemorrhagic gastroenteritis and anemia, larval migration through tissues of the pig results in the spread of infectious organisms from the gut as well as extensive tissue damage compromising organ function.

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Obeagu Uno in Enugu is part of the Eastern region in Nigeria where pig farming is making waves in Enugu South Local Government Area of Enugu State. The local pigs have been demonstrated to be less susceptible to endo parasite than exotic breeds, this may be due to multiple fat and oil produced by this exotic breeds. The losses caused by intestinal parasite to pigs are so enormous, it is important to conduct a research on the prevalence of gastro intestinal parasites of pigs. Knowledge of the occurrence of particular parasites species will enable the veterinary services to identify possible public health threats and develop prophylactic measure to reduce the parasite density among pig herds. This will provide a base line data and help in formulating development and extension programs for communal and local farmers in parts of Obeagu Uno, Enugu State.

## MATERIALS AND METHODS

### Description of the Study Area

This study was carried out in Obeagu-Uno, Awkunanaw Enugu South L.G.A, Enugu State Nigeria. Obeagu Uno, in Akunanaw is situated at the middle of Nkanu land. According to 2016 census, Obeagu Uno, Awkunanaw in Enugu South L.G.A has an area of 67km$^2$ and a population of 267, 300 with population density of 2,827/km$^2$. It has a Longitude of 7◦30E and latitude of 6◦24N. Majority of the population are Igbo ethnic group, Igbo and English are the major language in Enugu South.

### Sample collection and Processing.

A visit was done at Obeagu Uno pig farm to make preliminary arrangement towards collection of the samples. Fecal samples were collected as early as 6:00-8:00 am weekly during the study period. The size, sex, age, and breed of the samples from the animals were properly recorded.

One hundred and sixty four (164) faecal samples were collected from pigs kept under different systems of management. The pigs were restrained and faecal samples were collected through the rectum by rectal palpation. Using clean disposable hand gloves, two fingers were inserted gently into the rectum to collect feces and were transferred into a clean sample container which was labeled in order. Indices of the pigs were done such as identification of exotic breed or local breed.

### Macroscopic

The faecal samples were examined macroscopically for their consistency (water content) as watery, loose, and soft formed and then categorized as either diarrheic or non-diarrheic.

### Parasitological Examination

The samples were well labeled and transported to ESUT parasitology laboratory for analysis within 24hrs. The samples were analyse using formal-ether concentration technique.

### Formal-ether concentration technique

About 1g of stool sample was emulsified with 4ml of 10% formal saline in a test tube. The mixture was filtered into a centrifuge tube using a cloth gauge and 3-4ml diethylether was added, shaker vigorously and allowed to stand for two minutes. The mixture was then centrifuged at 1000 revolutions per minutes (1000 rpm) for 3minutes. Using a glass rod, the faecal debris from the side of the tube was loosened and the tube inverted to pour off the supernatants. The tube was returned to its original upright position

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and the fluid from the side of tube allowed drain to the bottom. The crude deposit was mixed by tapping the tube with the finger and use of Pasteur pipette. A drop of crude sediment was applied on a free grees and view under microscope using ×10 and ×40 objectives. Lugol's iodine was used as a stain. The parasites was identified using the morphological structure as previously described (Chhabra and Mafukidze, 1992; Soulsby, 2012; Widisuputri *et al*., 2020).

**Statistical Analysis**

The data obtained were expressed in percentages and presented in tables. Using Chi square test, with 95% confidence intervals (CI) was used to determine the significant difference in the gastrointestinal parasites and the level of significant is at $p< 0.05$.

**RESULTS**

A prevalence of 51.2 % was observed in the 164 fecal samples of pig analysed for intestinal parasite. Of this prevalence *Ascaris suum* 22 (13.4%), *Trichuriss* spp 9 (5.48%), *Balantidium* spp 17 (10.4%), *Blastocystis* spp 11 (6.70%), *Strongyloides* spp 14 (8.53%) and *Oesophagostomum* spp 11 (6.70%). The distribution of parasite in pigs in both sexes is shown in Table 2. Of the total number of 164 faecal samples examined, 84 (51.2%) were positive for different parasites infection, out of which 48 (57.1%) were males and 36 (42.8%) were females. The distribution of eggs of parasites found across the male in this study were those of *Ascaris spp*. (54.5%), *Trichuris* spp. (44.4%), *Balantidium* spp. (58.8%), *Blastocystis* spp. (6.36%), *Strongyloides* spp. (50.0%) and *Oesophagostomum* spp. (72.7%), while in female the highest was *Trichuris* spp (55.5%), *Ascaris* spp (45.4%), *Balantidium* spp (41.1%), *Blastocystis* spp (36.3%), *Strongyloides* spp, (50.0%) and *Oesophagostomum* spp (27.2%). The distribution of parasite in the pigs across the breed examined in this study is presented in Table 3. Of the total positive cases of 84 (51.2%) samples, 59 (70.2%) were from exotic breed, 7 (8.33%) were local indigenous breed, while 18 (21.4%) were of crosses breed.

**Table 1: Overall prevalence of intestinal parasite of pigs at Obeagu**

| Parasite encountered | No. Exam | No. +ve | infection % |
|---|---|---|---|
| *Ascaris suum* | | 22 | 13.4 |
| *Trichuris* spp | | 9 | 5.48 |
| *Balantidium* spp | | 17 | 10.4 |
| *Blastocystis* spp | | 11 | 6.70 |
| *Strongyloides* spp | | 14 | 8.53 |
| *Oesophagostomum* spp. | | 11 | 6.70 |
| Total | 164 | 84 | 51.2 |

**Table 2: Distribution of parasite eggs of pigs in both sexes in Obeagu**

| Parasite | Sex |
|---|---|

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| | Male | Female |
|---|---|---|
| *Ascaris suum* | 12 (54.5) | 10 (45.4) |
| *Trichuris* spp | 4 (44.4) | 5 (55.5) |
| *Balantidium* spp | 10 (58.8) | 7 (41.1) |
| *Blastocystis* spp | 7 (6.36) | 4 (36.3) |
| *Strongyloides* spp | 7 (50.0) | 7 (50.0) |
| *Oesophagostomum* spp | 8 (72.7) | 3 (27.2) |
| Total | 48 (57.1) | 36 (42.8) |

Table 3: Parasite distribution across the breed of pigs in Obeagu Uno

| | Breed | | |
|---|---|---|---|
| Parasite | Exotic | Local | Crosses |
| *Ascaris suum* | 16 (72.7) | 2 (9.09) | 4 (18.18) |
| *Trichuris* spp | 6 (66.6) | 1 (11.1) | 2 (44.4) |
| *Balantidium* spp | 13 (76.4) | 1 (5.88) | 3 (17.6) |
| *Blastocystis* spp | 7 (63.4) | 0 (00.0) | 4 (36.4) |
| *Strongyloides* spp | 8 (57.1) | 2 (14.2) | 4 (28.5) |
| *Oesophagostomum* spp | 9 (72.7) | 1 (9.09) | 1 (9.09) |
| Total | 59 (70.2) | 7 (8.33) | 18 (21.4) |

## DISCUSSION

The present study investigated the prevalence and diversity of gastro intestinal parasites of pigs at Obeagu Uno. Our findings of 51.2% overall prevalence of gastrointestinal parasites in the pigs is not in concordance with the findings from Burkina Faso and Uganda who recorded above 50% 91% Tamboura *et al*., 2006; Nissen *et al*., 2010), with much higher than that of the reports from Indonesia 100% (Widisuputri *et al*., 2020), Bangladesh 96.4% (Dey *et al*., 2014), Brazil 93.1% (Barbosa *et al*., 2015). In contrast, the study had a result higher than the reports from Kenya 48% – 44.2% (Kagira *et al*., 2012; Obonyo *et al*., 2013), Tanzania 33% (Nonga & Paulo, 2015), South Africa 49.2% (Nwafor *et al*., 2019) and Korea 33.5% (Ismail *et al*., 2010). The difference in the prevalence of parasites in these studies can be attributed to many factors such as variation in sample size, sampling season, sex and breeds of the pigs and their immune system, the diversity in the climate and husbandry practices. One of the reasons for the higher prevalence of intestinal parasites in this study could be due to the poor rearing condition and unaware of danger of intestinal parasite of the pigs. Many farmers in the study area have little or no information of effective pig rearing and farm management practices. In Obegau, the farmers usually do not pay much attention on standard practice of pig farming or they rather commission it out to labourer who may not have interest in maximizing the opportunity of pig farming. Some or most of pigs sampled were fed

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inadequately and untimely and kept in wood-built and untidy pens with the porous floor. These components could generate higher moisture content that attract mechanical vectors such as flies in the pens that have contributed to diverse parasites. Although, pigs themselves are the natural reservoir of many parasites recorded in this study. The parasitic diversity in this research, *Ascaris suum* had the highest prevalence rate (13.4%) the finding is not in concordant with findings from other countries: Indonesia (99%) Widisuputri *et al.* (2020), Kenya (87%) (Kagira *et al.*, 2012), from China 55.4% (Ji *et al.*, 2019); United Kingdom 52.4% (Jacob *et al.*, 2016) and Brazil 18.6%–44.3% (Barbosa *et al.*, 2015). Various *Trichuris* species have been previously reported in pigs, this study recorded (5.48%). The prevalence rate of *Balantidium* spp was (10.4%), which is higher to the findings from USA 7.4% (Kváč *et al.*, 2009), India 7.63% (Patra *et al.*, 2019) and Turkey 3.7% (Uysal *et al.*, 2009), but lower than that reported from Canada 66.4% (Farzan *et al.*, 2011), the United Kingdom 57.1% (Minetti *et al.*, 2014), Australia 31.1% (Armson *et al.*, 2009) and Denmark 14% (Petersen *et al.*, 2015), *Oesophagostomum* spp, a common natural parasite of pigs, was reported in 6.70% of the samples. This rate was lower than the findings from Indonesia 79% (Widisuputri *et al.*, 2020), Brazil 46.4%–71.6% (Barbosa *et al.*, 2015), Korea 64.7% (Ismail *et al.*, 2010), Kenya 64% (Kagira *et al.*, 2012), Colombia 42% (Mendoza-Gómez *et al.*, 2015), Bangladesh 40% (Dey *et al.*, 2014) and India 29.48% (Patra *et al.*, 2019). *Strongyloides* spp accounted (8.53%) prevalence report of this parasite was lower than the findings from Uganda 89% (Nissen *et al.*, 2010), Kenya 75% (Obonyo *et al.*, 2013), Tanzania 52% (Nonga & Paulo, 2015) and Brazil 46.6% (Barbosa *et al.*, 2015) but higher than the findings from Ghana 7% (Atawalna *et al.*, 2016) and India 8.1% (Patra *et al.*, 2019). Exotic breeds also naturally possess a high gastrointestinal parasitic rate (Murthy *et al.*, 2016), possibly contributing to a high prevalence rate in the faecal samples studied. Male accounted the highest parasitic prevalence (57.1%), and the lowest (42.8%) in female pigs. Similar results were also reported from Tanzania (Nonga & Paulo, 2015) and India (Sharma *et al.*, 2020). This findings of a higher prevalence of intestinal parasites in males is in agreement with other published reports (Dey *et al.*, 2014; Sharma *et al.*, 2020; Sowemimo *et al.*, 2012). The lower prevalence parasitism on females in this study could be due to deworming practice performed by few farmers (field source) for adult pregnant pigs in pre-farrowing condition (2 weeks before farrowing). Additionally, testosterone hormone, which acts as an immunosuppressant (Salvador *et al.*, 1996), could have contributed to the higher prevalence of parasites in male pigs.

**CONCLUSIONS**

This study revealed parasitic infection as threat to pig production in Obeagu Uno in Enugu state, infected pigs in the area may saver as risk factor for spreading of the disease among humans and animals. In their community pig farming remains one of the major sources of income, therefore there is need to combat the menace of gastro intestinal parasites infection. The maintenance of pigs under traditional rearing system in Obeagu had a higher prevalence

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(51.2%) gastrointestinal parasite. The study suggest that pigs under traditional management can harbour a wide variety of intestinal parasites with higher prevalence. Thus, periodic trainings on practices for healthy and sustainable pig husbandry should be conducted targeting rural pig farmers. Additionally, deworming practices could help them to achieve maximum productivity and reduce the risk of transmitting potential pig-borne zoonotic diseases.

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