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Original Research

Prevalence of Gastro-Intestinal Parasites in Semi-intensive Pig Farming in Mizoram

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Abstract

The study included, faecal samples from 68 pigs belong to semi-intensive system farming. No anthelmintic treatment were given in these farms and samples were collected for the identification of certain parasitic eggs/ova i.e., Ascaris lumbricoides, Trichiuris trichiura, Strongyloides and Cryptosporidium. Epidemiological parameters such as population density of the farm, and system of housing and managemental practices were recorded using a standard format and analysed. Samples were then subjected to iodine/saline preparation, acid decolourisation, zinc floatation and NaOH concentration techniques for detection of any such eggs/ova. Thirty-eight samples were found positive for different ova. Overall prevalence of gastrointestinal parasites recorded among 68 pigs from different farm was 55.88%. A prevalence rate of 42.11% was recorded for Ascaris suum and 21.1% prevalence was recorded for cryptosporidium. Results were tabulated and discussed.

Keywords: Acid Decolourisation, Faecal, Pig, Sample, Semi-Intensive, Zinc Floatation

Introduction

North east region of India comprises of high proportion of tribal people and pig farming is the main source of their income source for livelihood. Lack of scientific knowledge in pig farming and poor healthcare and vaccination facilities stand on the way of improvement as lacunas (Talukdar *et al*., 2019). Numerous parasites are found to be in contact with man and animals for centuries, harboring the body in various ways, most commonly of which are found in pigs are *Ascaris lumbricoides, Ascaris suum, Trichiuris trichiura, Trichiuris suis, Schistosoma suis, Fasciolopsis buski, Fasciola hepatica etc*, which most of them are nematodes (Patra *et al*., 2019). Infections with geo-helminth, *i.e., Trichiuris trichiura* are at least as prevalent as *Ascaris lumbricoides* in many localities, and are associated with significant morbidity. Trichuriasis infection leads to trichuriasis syndrome or, chronic colitis with stunted growth (Bundy, 1986). The duration of maternal exposure to *Ascaris suum* is having an influence in distribution of worms to piglets (Boes *et al*., 1999). The presence of the parasite is said to be accompanied with high temperature (up to 106° F), blood mixed diarrhoea, emaciation, tympanic abdomen, edema and in general typhoid symptoms. Several of the cases have terminated fatally, owing, in part, at least to the late date at which treatment was sought (Hsieh, 1960).

The present investigation has been undertaken with the objectives of finding prevalence of parasitic ova in semi-intensive pig farming and to find out the efficacy of four diagnostic measures for the detection of parasitic ova in faecal samples *viz*. saline/iodine wet mount preparation technique, acid decolourisation, zinc floatation, NaOH concentration techniques in pigs.

Materials and Methods

Sixty-eight faecal samples were collected from different litters of Mizoram, mainly from rural areas where anthelmintic practice is less and not reared in concrete floor. Inclusion criteria for the sample collection were accessibility to the litters and availability of voluntary famers. Twenty-four samples were collected from males and 44 samples from females. Sterile plastic containers were used for the collection of samples (5 g) which are collected. Samples were sent to laboratory for examinations.

(1) Saline/Iodine Wet Mount Preparation Technique

A thin transparent layer of faecal smear was prepared on a microscopic glass slide by diluting faeces with normal saline (0.85%) and putting a cover slip over it. Iodine wet mount is prepared by mixing a small volume of faeces with Lugol's iodine on the glass slide that contain saline and put cover slip on it.

(2) Acid Decolourisation Technique: As per the method described by El-Naga and Gaafar (2014).

(3) Zinc Floatation Technique: As per the method of Alvarado-Villalobos *et al*. (2017).

(4) Concentration Technique: As per the method of Manser *et al*. (2016).

Data were analysed with Microsoft® Excel spreadsheet and was recorded.

Results and Discussion

Pigs are the most important livestock in the state of Mizoram and play a major role in the livelihood of the small farmers. Among the livestock, they are the most important most commonly reared livestock and every family rears them as backyard venture. The laboratory examination results could be summarized as follows-

Sixty-eight faecal samples were subjected for different laboratory examinations including iodine/saline preparation, acid decolourisation, zinc floatation and NaOH concentration techniques, from the College pig farms and in and around Aizawl city. Similar methods were used by Patra *et al.* (2019) for the detection of parasitic ova in their study on parasitic fauna of North East India. Among these samples collected, 38 samples (55.88%) were found to be positive for different ova (*Ascaris suum, Trichuris suis*, Strongyloides, Cryptosporidium) by iodine saline preparation/zinc floatation technique/Concentration method (NAOH). As per acid decolourisation technique, 8 samples were found positive (Cryptosporidium).

Among the 38 positive samples, 9 were male animals (23.68%) and 29 were female animals (76.32%). Twenty-one samples out of 38 positive samples were positive in iodine/saline preparation (55.26%). Seventeen samples out of 38 positive samples were positive in zinc floatation technique (44.74%). Fourteen samples out of 38 positive samples were positive in concentration method (NaOH) (36.84%). Thirteen samples were positive in three (iodine/saline preparation, zinc floatation and NaOH concentration) techniques (34.21%). Eight samples out of 68 samples were positive (Cryptosporidium) in acid decolorisation technique (11.76%). Two samples are positive in saline/iodine wet mount preparation technique and concentration method (NaOH) (5.26%). One sample was positive in saline/iodine wet mount preparation technique and zinc floatation technique (2.63%). One sample was positive with zinc floatation technique and concentration method (NaOH) (2.63%).

This study revealed that the overall prevalence of gastrointestinal parasites recorded among 68 pigs from different farm was 55.88%. The different ova detected were *Ascaris suum* (16 Nos), *Trichuris suis* (9 No.), Strongyloides (5 No.) and Cryptosoridium (8 No.). Similar observations were made by Jufare *et al.* (2015) in their study on parasites of pigs in two farms with poor husbandry practices in Bishoftu, Ethiopia. The higher prevalence of intestinal parasites recorded in this study could be as a result of poor management practices in the farm, such as lack of cleaning and shortage of disinfectants used for pens, poor feeding practice and the non-use of anthelmintic drugs. Coprophagy of pigs, their free access to garbage and gain of entry of pigs to potentially contaminated areas are reasons for gastrointestinal parasites in pigs (Kaur *et al*., 2017).

This study also revealed that *A. suum* was the most prevalent parasite (42.11%). This is in agreement with earlier reports. Kumar *et al*. (2002) reported that, *A. suum* was the most prevalent parasite in scavenging pigs and also in semi-intensively managed pigs (Nsoso *et al*., 2000). The eggs of *T. suis* could survive for long in the environment and this can be the reason for fairly high prevalence (23.68%) (Pittman *et al*., 2010). In this study, the prevalence of intestinal parasites was higher among female pigs than in males, which is in agreement with the findings of Tamboura *et al*. (2006). This may be because of the large number of samples collected from female pigs. Saline wet mount is used for the detection of trophozoites, protozoal cysts and helminthes (Tankeshwar, 2015 and Khanna *et al*., 2014). In this study, ova were detected from more samples by this technique. For the diagnosis of parasitism, wet mount preparation of faecal sample is extensively used in laboratory and saline and Lugol's iodine is the frequently used in wet mount (Zaman *et al*., 2017). A percentage of 21.1% was recorded for cryptosporidium among positive samples. Cryptosporidium oocysts can survive for long periods in fecal material, then most bacterial agents (Xiao *et al*., 2006). The presence of acid-fast lipids in the cell wall and the property of auto fluorescence are the properties of cryptosporidium that make it fit by staining with modified acid-fast stain (Garcia *et al*., 2018). Modified acid-fast staining test was used by many workers for screening faecal samples for the presence of cryptosporidium (Tahvildar-Biderouni and Salehi, 2014 and Rekha *et al*., 2016). Coccidiosis causes poor performance in pigs due to diarrhoea and predisposes the animals to infectious diseases (Jufare *et al.*, 2015).

Many workers recommended zinc floatation technique as the best option for the detection of trematode eggs (Alvarado-Villalobos *et al*., 2017). Zinc sulphate McMaster flotation appears to be the best technique to use in studies concerning nematodes and large protozoa (Pouillevet *et al*., 2017). Moreover, it results in a cleaner wet-mount preparation than the sedimentation procedure (Garcia *et al*., 2018). NaOH concentration techniques will separate the parasites from faecal debris, increase the number of parasites in the sediment, and unmask them the technique is appropriate for stool parasites, especially trematode eggs and protozoan cyst, in faeces with a high fat content (Suwansaksri *et al*., 2002).

Conclusion

Faecal samples of pigs were screened and different ova detected from faecal samples were *Ascaris suum*, *Trichuris suis*, Strongyloides and Cryptosoridium. The comparative efficacies of different detection techniques are discussed. As we know, these parasites are multiplying at a high rate under favourable conditions; we should take proper preventive measures and hygienic care so as to keep an individual safe from a diseased condition and for production of clean pork.

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Conflict of Interests

There is no conflict of interest.

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References

1. Alvarado-Villalobos, M. A., Cringoli, G., Maurelli, M. P., Cambou, A., Rinaldi, L., Barbachano-Guerrero, A., Guevara, R., Chapman, C. A and Serio-Silva, J. C. (2017). Flotation techniques (FLOTAC and mini-FLOTAC) for detecting gastrointestinal parasites in howler monkeys. *Parasites and Vectors*. 10 (586):1-8.
2. Boes, J., Coates, S., Medley, G.F., Varady, M., Eriksen, L., Roepstorff, A. and Nansen, P. (1999). Exposure of sows to *Ascaris suum* influences worm burden distributions in experimentally infected suckling pigs. *Parasitology*. 119: 509-520.
3. Bundy, D. A. P. (1986). Epidemiological aspects of Trichiuris and Trichiuriasis in Caribbean communities. *Transactions of the Royal Society of Tropical medicine and Hygiene*. 80 (5): 706-718.
4. El-Naga, I. F. A. and Gaafar, M. R. (2014). Auramine-Phenol vs. Modified Kinyoun's Acid Fast Stains for Detection of Coccidia Parasites. *Laboratory Medicine*. 45 (1): 65-73.
5. Garcia, L. S., Arrowood, M., Kokoskin, E., Paltridge, G. P., Pillai, D. R., Procop, G. W., Ryan, N., Shimizu, R. Y. and Visvesvara, G. (2018). Laboratory Diagnosis of Parasites from the Gastrointestinal Tract. *Clinical Microbiology Review*. 31(1).
6. Hsieh, H. C. (1960). Studies on the Epidemiology of *Fasciolopsis buski* in South Taiwan. *Formosan Science*. 14(3): 95-120.
7. Jufare, A., Awol, N., Tadesse, F., Tsegaye, Y., Hadush, B. (2015). Parasites of pigs in two farms with poor husbandry practices in Bishoftu, Ethiopia. *Onderstepoort Journal of Veterinary Research*. 82(1): 839.
8. Kaur, M., Singh, B. B., Sharma, R. and Gill, J. P. S. (2017). Prevalence of gastro intestinal parasites in pigs in Punjab, India. *Journal of Parasitic Diseases*. 41(2): 483–486.
9. Khanna, V., Tilak, K., Rasheed, S. and Mukhopadhyay, C. (2014). Identification and Preservation of Intestinal Parasites Using Methylene Blue-Glycerol Mount: A New Approach to Stool Microscopy. *Journal of Parasitology Research*. 2014: 1-4.
10. Kumar, S., Prasad, K. D, Singh S. K, Kumar, S. (2002). Prevalence of common gastrointestinal parasites in pigs at and around Ranchi, Jharhand. *Indian Journal of Animal Sciences*. 72:35-37.
11. Manser, M. M., Saez, A. C. S and Chiodini, P, (2016). Faecal Parasitology: Concentration Methodology Needs to be Better Standardised. *Neglected Tropical Diseases*. 10 (4): 1-16.
12. Nsoso, S. J., Mosala, K. P., Ndebele, R. T. and Ramabu, S. S. (2000). The prevalence of internal and external parasites in pigs of different ages and sexes in southeast district, Botswana. *Onderstepoort Journal of Veterinary Research*. 67:217-220.
13. Patra, G., Al-Abodi, H. R., Sahara, A., Ghosh, S., Borthakur, S. K., Polley, S., Behera, P. and Deka, A. (2019). Prevalence of parasitic fauna of pigs in North-Eastern region of India, *Biological Rhythm Research*. doi.org/10.1080/09291016.2019.1573460
14. Pittman, J. S., Shepherd, G., Thacker, B. J. and Myers, G. H. (2010). *Trichuris suis* in finishing pigs: Case report and review. *Journal of Swine Health Production*. 18(6):306-313.
15. Pouillevet, H., Dibakou, S., Ngoubangoye, B., Poirotte, C. and Charpentier, M. J. E. (2017). A Comparative Study of Four Methods for the Detection of Nematode Eggs and Large Protozoan Cysts in Mandrill Faecal Material. *Folia Primatologica*. 88:344–357.
16. Rekha, K. M. H., Puttalakshmamma and D'Souza, P. E. (2016). Comparison of different diagnostic techniques for the detection of cryptosporidiosis in bovines. *Veterinary World*. 9(2): 211–215.
17. Suwansaksri, J., Nithiuthai, S., Wiwanitkit, V., Soogarun, S. and Palatho, P. (2002). The Formol-Ether Concentration Technique for Intestinal Parasites: Comparing 0.1 N Sodium Hydroxide with Normal Saline Preparations. *Southeast Asian Journal of Tropical Medicine and Public Health*. 33 Suppl 3: 97-98.

18. Tahvildar-Biderouni, F. and Salehi, N. (2014). Detection of *Cryptosporidium* infection by modified ziehl-neelsen and PCR methods in children with diarrheal samples in pediatric hospitals in Tehran. *Gastroenterology Hepatology from Bed to Bench*. 7(2): 125–130.
19. Talukdar, P., Talukdar, D., Sarma, K. and Saikia, K. (2019). Prospects and Potentiality of Improving Pig Farming in North Eastern Hill Region of India: An Overview. *Indian Journal of Livestock Research*. 9 (1): 1-14.
20. Tamboura, H. H., Banga-Mboko, H., Maes, D., Youssao, I., Traore, A., Bayala, B., Dembele, M. A. (2006). Prevalence of common gastrointestinal nematode parasites in scavenging pigs of different ages and sexes in Eastern Centre Province, Burkina Faso. *Journal of Veterinary Research*. 73:53-60.
21. Tankeshwar, A. (2015). Direct Saline/ Iodine Wet Mount for Diagnosis of Intestinal Parasites. Lab Diagnosis of Parasitic Disease. https://microbeonline.com/saline-wet-mount-diagnosis-intestinal-parasites/
22. Xiao, L., Moore, J. E., Ukoh, U., Gatei, W., Lowery, C. J., Murphy, T. M., Dooley, J. S. G., Millar, B. C., Rooney, P. J. and Rao, J. R. (2006). Prevalence and Identity of *Cryptosporidium* spp. in Pig Slurry. *Applied Environmental Microbiology*. 72(6): 4461–4463.
23. Zaman, R. F., Khanum, H., Nargis, S. and Das, P. K. (2017). Comparison of Saline, Iodine and KOH Wet Mount Preparations for Occurrence of Parasites in Stool Samples from Patients Attending ICDDR, B. *Bangladesh Journal of Zoology*. 45(2): 159-170

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