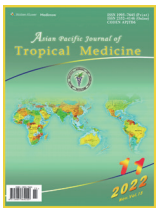

Letter to Editor

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Intestinal parasitic infections in Aetas and domesticated swine in Pampanga, Philippines

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Indigenous peoples account for about 6% of the world's population and are highly vulnerable to parasitic infections[1,2]. Aetas, one of the indigenous people groups in the Philippines, rely on backyard swine production as their primary means of livelihood[3]. Literature indicated that zoonoses arise from close physical contact and the co-habitation of humans with domesticated animals[4]. *Ascaris* spp. and *Trichuris* spp. both infect humans and swine, and these intestinal parasites lack differences in their morphological characteristics. Cross infections and/or zoonotic potential of these parasites are highly suspected[5]. Limited studies are available on the prevalence of intestinal parasitic infections among IPs and their domesticated animals. Consequentially, this study aims to determine the prevalence of intestinal parasitic infections in Aetas and swine in Brgy. Villa Maria, Porac, Pampanga.

A combination of 223 fecal samples from Aetas (<65 years) and 27 fecal samples from swine were collected. These samples were processed using Formalin-Tween Concentration and Concentration McMaster techniques to qualitatively determine the intestinal parasite infections in Aetas and swine, respectively. The prevalence of intestinal parasites in Aetas and swine was calculated by dividing the number of infected Aetas/swine by the total number of assessed Aetas/swine.

The overall prevalence of intestinal parasitic infection in Aetas was 71.3%. The most prevalent intestinal helminth was *Ascaris* spp. at 65.4%, followed by *Trichuris* spp. at 54.7% and hookworm at 44.0%. The most common co-infection was with *Ascaris* spp.+*Trichuris* spp. with an overall prevalence of 19.5%; followed by co-infections with *Ascaris* spp.+*Trichuris* spp.+hookworm (13.8%), *Ascaris* spp.+hookworm (9.4%) and *Trichuris* spp.+hookworm (7.5%) (Table 1).

An overall prevalence of 96.3% was recorded from a total of 27 swine examined in the study. The most prevalent intestinal parasite was hookworm at 84.6% followed by *Trichuris* spp. at 61.5%, *Ascaris* spp. at 53.8%, and *Coccidia* spp. at 50.0%. The most common co-infection was with *Ascaris* spp.+*Trichuris* spp.+hookworm, with an overall prevalence of 30.8%; followed by co-infections with *Ascaris* spp.+*Trichuris* spp.+hookworm+*Coccidia* spp. (15.4%), *Coccidia* spp.+hookworm (11.5%), *Coccidia* spp.+*Trichuris* spp.+hookworm (7.7%), *Trichuris* spp.+hookworm (3.8%), and *Ascaris* spp.+*Coccidia* spp.+hookworm (3.8%) (Table 1).

The presence of *Ascaris* spp., *Trichuris* spp., and hookworm in

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Table 1. Distribution of intestinal parasite infection in Aetas and swine in Brgy. Villa Maria, Porac, Pampanga [*n* (%)].

Parasitological parameters	Aetas (*n*=159)	Swine (*n*=26)
Positive for at least one type of intestinal parasite	79 (49.7)	6 (23.1)
Positive for *Ascaris* spp.	104 (65.4)	14 (53.8)
Positive for *Trichuris* spp.	87 (54.7)	16 (61.5)
Positive for hookworm	70 (44.0)	22 (84.6)
Positive for *Coccidia* spp.	-	13 (50.0)
Ascaris spp.+*Trichuris* spp. co-infection	31 (19.5)	1 (3.8)
Ascaris spp.+ hookworm co-infection	15 (9.4)	
Coccidia spp.+hookworm co-infection	-	3 (11.5)
Trichuris spp.+hookworm co-infection	12 (7.5)	1 (3.8)
Ascaris spp.+*Coccidia* spp.+hookworm co-infection	-	1 (3.8)
Ascaris spp.+*Trichuris* spp.+hookworm co-infection	22 (13.8)	8 (30.8)
Coccidia spp. +*Trichuris* spp.+hookworm co-infection	-	2 (7.7)
Ascaris spp.+*Trichuris* spp.+hookworm+*Coccidia* spp. co-infection	-	4 (15.4)

both Aetas and their domesticated swine may indicate a possible occurrence of zoonosis in the community. These intestinal parasites have zoonotic potential[6]. Majewska *et al.*[7] claimed that there are limited studies about the definite transmission modes of most zoonotic helminths, including those with high zoonotic potential. Therefore, it is essential to consider the factors that may facilitate its transmission, such as poor hygiene and sanitary practices, close contact with infected animals, and exposure to water and soil contaminated with animal feces[4,8,9]. Morphological characterization of intestinal parasites in Aetas and swine limits the identification of the parasites up to species level. Thus, comprehensive molecular techniques and in-depth studies on the factors triggering the zoonotic potential of these parasites are necessary to ascertain possible zoonotic infections between humans and swine, particularly in indigenous' communities.

Conflict of interest statement

The authors declare that they have no conflict of interest.

Ethical considerations

The protocol of this study was reviewed and approved following the existing institutional guidelines and by the appropriate authorities from the National Commission for Indigenous Peoples-Region 3 and the Local Government Unit of Porac. Before data collection, the objectives and procedures of the study were explained to the officers of the Rural Health Unit (Porac), Department of Agriculture-Municipality of Porac and Brgy. Villa Maria. The consent letter was well-understood and signed by the parents/guardians for the children's (lower than 18 years old) participation. Likewise, consent from the owners of the swine was obtained. All Aetas and swine found positive with intestinal parasites were referred to the local health and agricultural units of Porac, respectively, for appropriate management and treatment. The results and recommendations of this study were communicated to the concerned authorities.

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Authors' contributions

J.J.R.D. and M.J.C.F. designed the study and conducted a literature search. J.J.R.D. and M.J.C.F. performed the data collection and laboratory analysis. Also, both J.J.R.D. and M.J.C.F. wrote and drafted the manuscript. All authors worked on the interpretation and analysis of the data and results. M.J.C.F., D.E.P.S., E.S.V.M., and V.Y.B. Jr critically examined and commented on the manuscript. All authors revised and reviewed the final version of the manuscript before submission.

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