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A Study on the Prevelence of *Cysticercus cellulose* in Pigs of Son La Province, Vietnam

Nguyen Thi Kim Lan*, Do Thi Lan Phuong, Phan Thi Hong Phuc, Pham Dieu Thuy, Dao Van Cuong
Faculty of Animal Husbandry and Veterinary Medicine, Thai Nguyen University of Agriculture and Forestry, Thai Nguyen city, Thai Nguyen prefecture, Vietnam

Original Research Article

***Corresponding author**
Nguyen Thi Kim Lan

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Abstract: Human taeniasis was found from more than 50 provinces in Vietnam, and in which the highest prevalences have always been observed in the highland and mountainous areas. In addition, *Cysticercus cellulose* infection of pigs is considered as one of the most risk factor that contribute to taeniasis in human. Therefore, our study investigated both of the prevelence of *Cysticercus cellulose* in pigs and *Taenia solium* in human in the 3 communes of Son La, a moutainous province, in order to identify if there is such kind of correlation between the infected rates of pigs and human. Our results show that the prevelences of *Cysticercus cellulose* in pigs and *Taenia solium* in human in the 3 communes were high when comparing to other ares of Vietnam, however, they are within the range of the disease infected rates in Vietnamese mountainous ares. In addition, we observed that infectionof *Cysticercus cellulose* in pigs was closely associated by infection of *Taenia solium* in human, and also vice versus. In addition, because although cysticerci of *Taenia solium* occur primarily in pork, they also occur in humans, so humans can have both taeniasis and cysticercosis (including neurocysticercosis), which are dangerous and health-damaged in many cases. Therefore we suggest that in order to eliminate this meat-borne parasitoses, the effective prevention and treatment are required to applied simutanously on both pigs and humans of the areas.

Keywords: *Cysticercus cellulose, Taenia solium, Vietnam, mountainous area*.

INTRODUCTION

Taeniasis and cysticercosis are endemic in Africa, South and Central America, Brazil, Mexico, China, India, Myanmar, Malaysia, Korea, Indonesia, Philippines, and Southeast Asia, including Vietnam [1-3]. It has been estimated that hundreds of millions of persons worldwide are infected with *Taenia solium*, the most serious tapeworm species to humans [4, 1, 5]. Human taeniasis was found from more than 50 provinces in Vietnam [3]. In addition, the highest prevalence was in the highland and the mountainous areas [6,7]. In our study, we investigated the prevelence of *Cysticercus cellulose* in pigs and *Taenia solium* in human in the 3 districts of Son La province, a moutainous area, in order to identify if there is a relationship between the infected rates on pigs and human.

MATERIALS AND METHODS

The prevelences of *Cysticercus cellulose* were identified in 1040 pigs in Bac Yen, Muong La and Mai Son communes, by the exploratory surgery method. The prevelences of *Taenia solium* were diagnosed in 750 people of the same communes. We identified the significance of correlation between the infected rates by evaluatig the Pearson correlation coefficient value.

RESULTS AND DISCUSSION

The prevelences of *Cysticercus cellulose* in pigs of the 3 communes of Son La province are shown in Table-1 and Photo 1-5.

Table-1: The prevelences of *Cysticercus cellulose* in pigs of the 3 communes of Son La province

Commune	**Number of diagnostic pigs**	**Number of infected pigs**	**Prevelence** (%)
Bac Yen	351	11	3.13
Muong La	337	9	2.67
Mai Son	352	7	1.99
Total	**1,040**	**27**	**2.59**

Photo-1: *Cysticercus cellulosae*in pig muscle

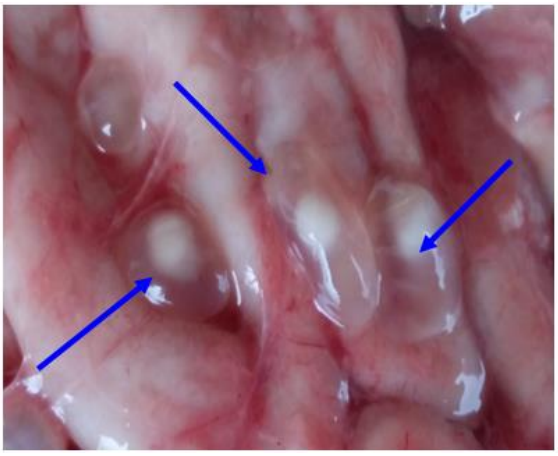

Photo-2: *Cysticercus cellulosae* in pig brain

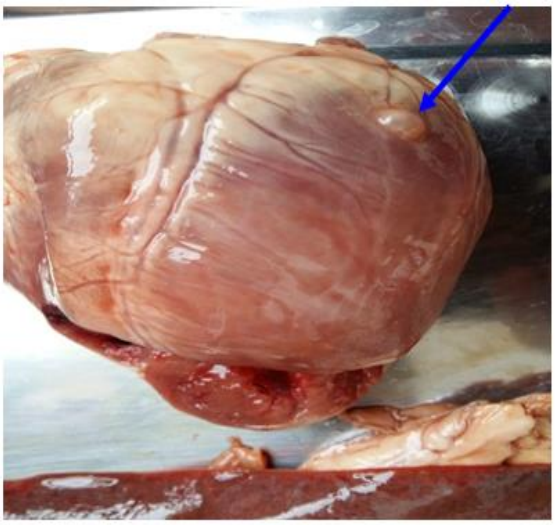

Photo-3: *Cysticercus cellulosae* in pig heart

Photo-4: *Cysticercus cellulosae*in pig tonge

Photo-5: Isolated *Cysticercus cellulosae* from pig organs

From Table-1, we observe that the prevelence of *Cysticercus cellulosae* in pigs of the 3 communes are relatively high, from 1.99 to 3.13 %. The prevelences are much higher than those identified in the northern and the southern slaughter houses in Vietnam, from 0.03 to 0.9 % [7, 8]. It can be explained by the fact that Son La is a mountainous area with the undeveloped economic situation, in which pigs are usually let wandering freely outside in daytime, and therefore they are easily to get access to the parasitic contaminated sources.

We also identified the prevelences of *Taenia solium* in human of the 3 communes of Son La province, and the results are shown in Table-2 and Photo 6.

Table-2: The prevelences of *Taenia solium*in human of the 3 communes of Son La province

Commune	**Number of diagnostic humans**	**Number of infected humans**	**Prevelence**(%)
Bac Yen	250	10	4.00
Muong La	250	8	3.20
Mai Son	250	5	2.00
Total	**750**	**23**	**3.07**

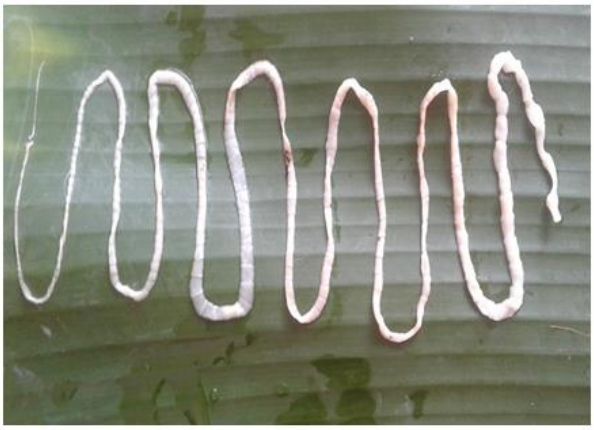

Photo-6: *Taenia solium* infected in human

From Table-2, we observe that the prevelence of *Taenia solium* in human of the 3 communes are relatively high, from 2.00 to 4.00 %. However, the prevelences are within the normal infected range of the mountainous areas in Vietnam recorded in several previous research, which reporting the rates of from 2.0 to 10.4% [6, 7]. Unhygienic toilet systems in mountainous areas, such as shown in photo 7, is usually considered as an important reason that contributing to the high prevelence of *Taenia solium* in human.

Photo-7: A typical human toilet in Son La province

In order to identify the relationship, we computed the linear regression and calculated the Pearson correlation coefficient value between the infected rates of *Cysticercus cellulose* in pigs and of *Taenia solium* in human of the 3 communes of Son La province, and the resultis shown in Figure-1.

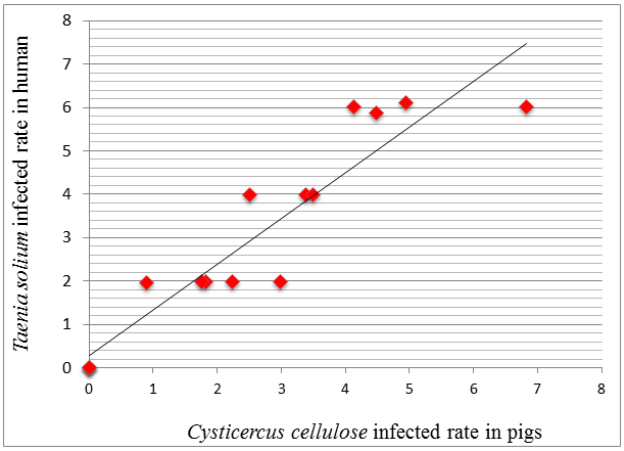

Fig-1: The computed linear regression between the infected rates of *Cysticercus cellulose* in pigs and of *Taenia solium* in human of the 3 communes of Son La province

From Figure-1, we observe that the Pearson correlation coefficient value (R) was significant and close to 1 (R = 0.929), suggesting that infection of *Cysticercus cellulose* in pigs is highly associated by infection of *Taenia solium* in human and vice versus. Although cysticerci of *Taenia solium* occur primarily in pork, they also occur in humans. Therefore, humans can have taeniasis and cysticercosis (including neurocysticercosis), which is dangerous and health-damaged in many cases [9, 2, 3]. In order to eliminate this meat-borne parasitoses, the prevention and treatment methods are required to simutanously applied in both pigs and people of the areas.

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CONFLICT OF INTEREST

We have no conflict of interest related to this study.

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