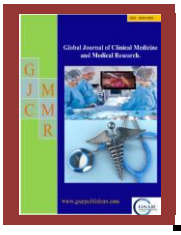

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SOME FACTORS RELATED TO THE SEROPOSITIVITY RATE OF *TOXOCARA CANIS* IN HOA HIEP COMMUNE, XUYEN MOC DISTRICT, BA RIA - VUNG TAU PROVINCE

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Abstract

Background: *Toxocariasis generally has three recognized syndromes: the atypical common form, visceral migratory larvae, and ocular larvae. This symptom is very severe, greatly affecting the health of the host, especially when the larvae are located in the nervous system and eyes.* Study Objectives

Objectives: *Determination of seropositive rate for toxocariasis and some related factors in Hoa Hiep commune, XUYEN MOC DISTRICT, Ba Ria-Vung Tau province.*

Subjects and Methods*:* *Cross-sectional descriptoin, subjects are people aged 4 years and older in hamlet 1, Hoa Hiep commune, XUYEN MOC DISTRICT, Ba Ria-Vung Tau provine.*

Results: *the seropositive rate of Toxocara canis was 30.1%, the group of people who regularly eat raw vegetables, wash raw vegetables/fruits uncleanly, are regularly in contact with dogs, are not hygienic for dogs, and do not wash their hands properly had a higher rate of toxocariasis in serum than the other group.*

Conclusion: *There is a relationship between the rate of Toxocara canis infection with the habit of eating raw vegetables, washing raw vegetables/fruits, contact with dogs, hygienic for,*

Keywords: *Toxocara canis larvae; Toxocara spp; dog roundworm larvae.*

I. INTRODUCTION

Toxocariasis, caused by *Toxocara canis*, is a zoonotic disease transmitted from animals to humans. Humans become infected by ingesting embryonated eggs containing *Toxocara canis* larvae. After entering the intestine, the larvae migrate to internal organs, where they can survive for years in a free or encapsulated form, but they never develop into adult worms [7], [8].

Toxocariasis typically presents in three clinical forms: asymptomatic (covert), visceral larva migrans, and ocular larva migrans. The symptoms can be severe, with significant impacts on host health, particularly when the larvae migrate to the nervous system or the eyes [3], [9].

Ba Ria - Vung Tau is a province in Southeastern Vietnam. Xuyen Moc District, located in the northeastern part of the province, has over 80.7% of its land used for agriculture an environment conducive to the spread of pathogens. Locals commonly keep dogs for guarding homes and fields; however, there is a lack of research on *Toxocara canis* larvae, associated risk factors, and effective prevention strategies.

To help assess the local prevalence, investigate some risk factors, and propose effective measures to reduce infection rates and improve disease control efforts, we conducted a study entitled:

"Seroprevalence of *Toxocara canis* and associated factors among residents of Hoa Hiep Commune, Xuyen Moc District, Ba Ria - Vung Tau Province"

with the following objectives:

1. To determine the seroprevalence of *Toxocara canis* in Hoa Hiep Commune, Xuyen Moc District, Ba Ria - Vung Tau Province.
2. To describe selected factors associated with *Toxocara canis* infection.

II. SUBJECTS AND METHODS

2.1. Study location: Hoa Hiep commune, Xuyen Moc district, Ba Ria - Vung Tau province

2.2. Study Subjects

2.2.1. Sampling Criteria

- **Target population:** Individuals aged 4 years and older, who are officially registered and permanently

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residing in Hoa Hiep Commune, Xuyen Moc District, Ba Ria - Vung Tau Province.

- **Study sample:** Selected from the target population using inclusion criteria until the desired sample size was reached.

2.2.2. Exclusion Criteria

- Individuals who declined to participate.
- Individuals who were not present in the locality during the study period.
- Individuals unable to communicate (e.g., for the KAP component: participants <15 years old without a caregiver to respond on their behalf; participants ≥15 years old unable to complete the interview).

2.3. Study Design and Sample Size

- **Study design:** Cross-sectional descriptive study.
- Sample Size Calculation:

The sample size for estimating the seroprevalence of *Toxocara canis* was calculated using the following formula:

$$n = \frac{Z^2_{\left(1-\frac{\alpha}{2}\right)} p(1-p)}{d^2}$$

In there:

n: Minimum sample size needed to investigate to estimate the prevalence of *Toxocara canis* infection

α: Probability of type 1 error, choose α = 0.05 then $Z_{\left(1-\frac{\alpha}{2}\right)}$= 1.96.

p: Expected value of *Toxocara canis infection rate*, research by Nguyen Thi Bach Loc (2014), infection rate is 39.01% [6] .

d: Accuracy is the desired error range. Choose d = 0.05

Substituting the values into the above formula, we have n = 366.

Estimated rate of exclusion criteria (drop out) is 10%; Thus, the estimated number of individuals giving up is 366 × 10% = 37 individuals. So the sample size needed is: 366 + 37 = 403 individuals.

- Sampling method: Random sampling

+ Randomly select 01 hamlet out of 11 hamlets in Hoa Hiep commune, then select 80 - 120 households to achieve sample size: 403 individuals for the study.

+ In fact, we conducted research on 432 individuals.

2.4. The method of data collection

- Assess the rate of larval infection by blood testing to detect Toxocara canis larvae using ELISA testing technique.

- Investigate, survey and directly interview all patients coming for parasite testing from 4 years of age and older. (If 4 years old to < 15 years old cannot answer the interview, a parent or someone who regularly takes care of and is with the child will answer) through a set of questions.

2.5. Data Analysis

Figures are rounded to 1 decimal place.

Process data using SPSS 22.0 software

III. RESULT

3.1. Prevalence of *Toxocara canis* seropositivity at the study site

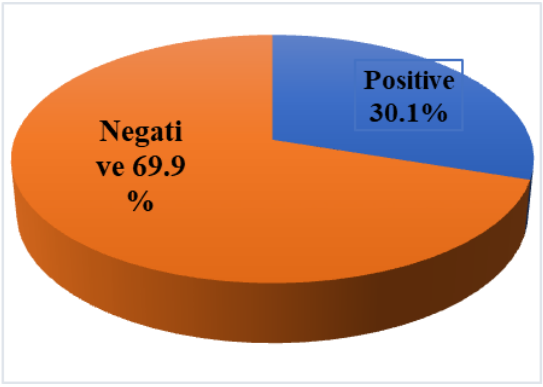

Figure 3.1: Toxocara canis seropositivity rate at the study site

Conducting serum tests using ELISA method on 432 people in Hoa Hiep commune, Xuyen Moc district, Ba Ria - Vung Tau province found the positive rate was 130/432, accounting for 30.1%.

3.2. Some factors related to *Toxocara canis infection*

Table 3.1. Relation between Toxocara canis seropositivity rate and factors such as eating raw vegetables and how to wash raw vegetables

**Regularly: eat raw vegetables 2-3 times/week*

*** Wash raw vegetables/fruits properly: wash under running water 2-3 times, then rinse in a basin/pot until the water runs clear.*

Through data analysis, the positive seroprevalence rate in the group that regularly eats raw vegetables is 1.9 times higher than the group that does not regularly eat raw vegetables, which is statistically significant (p<0.05).

The rate of positive serum in the group that washed raw vegetables/fruits incorrectly was 2.2 times higher than in the group that washed raw vegetables incorrectly, with statistical significance (p<0.05).

Table 3.2. Relation between Toxocara canis seropositivity rate and hand washing method

How to wash your hands	*Toxocara canis* (n=432)				OR (CI 95%)	p
	Positive		Negative			
	n	%	n	%		
Incorrect	94	72.3	184	60.9	1.7	
Correct *	36	27.7	118	39.1	(1.04-2.71)	0.03

* *Wash hands properly: wash hands with soap and under running water.*

The positive serum rate in the group that did not wash their hands properly was 1.7 times higher than that in the group that

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washed their hands properly, the difference was statistically significant (p<0.05).

Table 3.3. Relation between Toxocara canis seropositivity rate and exposure to dogs; hygiene for dogs

Element		*Toxocara canis* (n=432)				OR (CI 95%)	p
		Positive		Negative			
		n	%	n	%		
Contact with dogs	Yes	69	53.1	118	39.1	1.8 (1.14-2.73)	0.007
	No	61	46.9	184	60.9		
Dog hygiene	Yes	45	34.6	62	20.5	2,1 (1.29-3.23)	0.001
	No	85	65.4	240	79.5		

The positive seroprevalence rate in the group that regularly contacts dogs and does not clean dogs is higher than the other group, the difference is statistically significant (p<0.05)

Element		*Toxocara canis* (n=432)				OR (CI 95%)	p
		Positive		Negative			
		n	%	n	%		
Level eat raw vegetables	Regularly*	86	66.2	153	50.7	1.9 (1.21-2.99)	0.003
	Not Regularly	44	33.9	149	49.3		
Wash raw vegetables/fruits	True**	25	19.2	30	9.9	2,2 (1.15-3.99)	0.007
	False	105	80.8	272	90.1		

IV. DISCUSSION

4.1. Seropositivity rate for Toxocara canis at the study site

Through blood test results Toxocara canis larvae using ELISA testing technique showed that the seropositivity rate for Toxocara canis larvae in people in Hoa Hiep commune, Xuyen Moc district, Ba Ria - Vung Tau province is 30.1%. This rate is higher than the research results of Nguyen Thi Le Hang (2016) in Duc Phong commune, Mo Duc district, Quang Ngai province (18.3%) [2]. This problem can be explained by the characteristics of climate and geography. In Xuyen Moc district, Ba Ria - Vung Tau province, which has a tropical monsoon climate with lots of rain and high soil moisture, people have the habit of raising free-roaming dogs, which is favorable for infection with Toxocara canis larvae. However, research by Nguyen Thi Bach Loc (2014) in Buon Don district community (39%) [6] is equivalent to our research results. Dak Lak is a region with a majority of ethnic minorities, the intellectual characteristics of the population are not high, some customs and practices are still backward, the majority of people work in agriculture and are aware of personal hygiene and hygiene Dogs are not high ... are the causes of the quite high infection rate.

4.2. Some factors related to infection with Toxocara canis

4.2.1. *Relation between Toxocara canis seropositivity rate and factors such as eating raw vegetables and how to wash raw vegetables/fruits*

From the results of table 3.1 shows that the positive seroprevalence rate in the group that regularly eats raw vegetables (66.2%), and improperly washing raw vegetables/fruits (80.8%) is higher than in the group that does not regularly and eat raw vegetables. eating raw vegetables (33.9%), washing raw vegetables/fruits properly (19.2%), the difference is statistically significant (p<0.05). Research results of Ngo Thi Bon (2014) [1], Nguyen Thi Le Hang (2016) [2], Tran Van Lap (2018) [5], also showed similar results. The authors' research results show that the rate of infection with Toxocara canis larvae is related to factors such as eating raw vegetables and how to wash raw vegetables. Eating raw vegetables regularly and people's current way of washing raw vegetables/fruits cannot remove Toxocara canis pathogens from raw vegetables.

4.2.2. *Relation between Toxocara canis seropositivity rate and hand washing method*

The positive seroprevalence rate in the group that did not wash their hands properly (72.3%) was higher than that in the group that washed their hands properly (27.7%), the difference was statistically significant (p<0.05). According to research by Nguyen Thi Bach Loc (2014) [6], Nguyen Thi Le Hang (2016) [2], Tran Van Lap (2018) [5], also showed similar results. At the location where we conducted the research, people have the habit of raising free-roaming dogs, so toxocara canis eggs have the opportunity to spread into the environment. Proper hand washing (washing hands with soap and under clean running water) after contact with dogs, the

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soil environment and before eating is a key factor in preventing intestinal parasitic diseases including Toxocara canis Larval infection.

4.2.3. *Relationship between Toxocara canis seropositivity rate and factors of contact with dogs and dog hygiene*

The positive seroprevalence rate in the group that had frequent contact with dogs (53.1%), did not clean dogs (65.4%) was higher than the group that had no contact with dogs (46.9%), had dog hygiene (34.6%), the difference is statistically significant ($p<0.05$).

Comparison with the research results of Bui Xuan Hoan (2013) [4], Nguyen Thi Le Hang (2016) [2], Tran Van Lap (2018) [5], also shows the seroprevalence rate positive for Toxocara canis is related to factors of contact with dogs and dog hygiene related to dog contact and dog hygiene. Toxocara canis eggs are excreted in feces into the environment. Roundworm eggs stick to the fur, so not cleaning the dog and frequent contact with the dog are factors that increase the likelihood of being infected with Toxocara canis.

V. CONCLUSION

The seropositivity rate for *Toxocara canis* in patients at the study site was 30.1%; *Toxocara canis* seropositivity rate and the level of eating raw vegetables, how to wash raw vegetables/fruits, contact with dogs, dog hygiene and hand washing factors.

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