Identification Prevalence of Endoparasite in Canines Bayan Lepas, Penang

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Abstract

This study aims to determine the type, prevalence and influence of sex and age on the prevalence of gastrointestinal parasites on dogs in Bayan Lepas, Penang. Total of 100 samples of dog feces were collected from three Districts. Feces examination performed by direct smear, sedimentation, and floatation methods. The kind of helminth was *Trichuris* sp. 2% (2/100), *Dipylidium* sp. 2% (2/100), *Ancylostoma* sp. 1% (1/100), *Toxocara* sp. 2% (2/100), *Strongyloides* sp. 2% (2/100) and protozoa *Isospora* sp. 18% (18/100), *Giardia* sp. 1% (1/100) samples were positively infected by helminth and protozoa. According to the statistics analysis concluded that sex and age do not affect the prevalence of gastrointestinal parasite.

Keywords: Dog, Gastrointestinal, Helminth and Protozoa, Prevalence, Penang.

Introduction

In Bayan Lepas, Penang dogs are common pets in many households. The Veterinary Research Institute (VRI) is committed to monitor baseline incidences of diseases, which are important such as those harboured by the canine population, both pets as well as strays. Some of these diseases are zoonotic such as mange by *Demodex canis,* visceral larval migrants by *Ascaris* sp. and diarrhoea by *Giardia* sp. (Erwanas *et al*., 2014).

Dogs are competent reservoir hosts of several zoonotic pathogens and can serve as a readily available source of nutrition for many blood-feeding arthropods (Menn *et al.,* 2010). The clinical signs of parasitic infection are variable and occasionally some infected animals will be asymptomatic. However, severe clinical cases in young dogs will lead to diarrhoea, anaemia and death (Bowman, 1999).

Parasitic diseases can cause significant economic loss because it can cause health, reproductive, growth, productivity and even severe infections can lead to death. In addition to causing economic loss, the potential for disruption caused by parasitic infections is the occurrence of zoonosis, which are animal diseases that can be transmitted and impact on humans (Fromsa *et al.,* 2011).

Canine endoparasites consist of heartworms, tapeworms, hookworms, whipworms, roundworms, coccidia, *giardia* and flukes. According to Szabova *et al.,* (2007), the developmental stages of the endoparasites (cysts, sporocysts, eggs and larvae) can survive in the environment for a long time and represent a risk factor for animals and for the human population. Endoparasites are parasites that live in internal organs such as the liver, spleen, brain, digestive system, blood circulation, abdominal cavity, muscle, flesh and other body tissues. (Putri *et al.,* 2019).

Parasite that attacks will inhibit growth. The influence arises begins with the disruption of the metabolic system of the host body that damage the organs (intestines), so it can affect growth and can even lead to death. Transmission of parasitic infections of the gastrointestinal tract influenced by intrinsic factors of the animal's body, among others: animal species, age, gender, and animal condition or immunity. In addition to intrinsic factors, which also can affect the incidence of parasite infections are livestock management systems in the form of maintenance types, cage types, feed, and sanitation.

Otherwise, environmental aspects such as climate, temperature, humidity, altitude, and precipitation can also affect the incidence of parasitic infections. The climate determines the endemicity of the disease, while the weather determines the transmission of a parasitic disease

until the onset of epidemics. The habitat of pathogenic agents and the resistance of the host body determines the number of parasitic worms infecting the brood. Parasites that enter the host and live in a supportive environment for the spread of parasitic diseases will be able to multiply rapidly, if not immediately overcome it has an impact on the difficulty of prevention and subsequent eradication (Karim *et al.,* 2016).

Methods

Research Design

The study on the prevalence of digestive tract parasites in dogs at Bayan Lepas, Penang used a survey type study and the research design used *cross sectional study*. The type of sample used was feces from 100 dogs. Dog samples taken were male and female dogs with an age category of 4-8 years. The variables observed in this study used the independent variable consisting of the sex and age of the dog, as well as the dependent variable, namely prevalence.

The feces samples taken from Bayan Lepas, Penang. The fecal examination carried out at multipurpose lab Goon International College and for the identification of species of worms and protozoa at Goon International College. The study was carried out from November 2021 untill January 2022.

Materials and Tools Used for Research

Feces samples were taken from dogs with a total of 100 samples each, 10% formalin, potassium dichromate, saturated sugar, water, and aquadest. The equipment used are gloves, masks, cool box, specimen pots, glass rod, paper label, plastic spoon, object glass, cover glass, pipette Pasteur, centrifuge tube, tea filter, microscope, and centrifuge.

Data Analysis

The data obtained processed using the prevalence formula as follows (Budiharta, 2002):

$$\text{Prevalence} = \frac{\text{Number of infected samples}}{\text{Total number of samples examined}} \text{ x } 100$$

To determine the effect of sex and age on prevalence, the data analyzed by using the *Chi Square Test* in the SPSS for Windows 22.0 program.

Results and Discussion

Types of Gastrointestinal Parasites in Canines in Bayan Lepas, Penang

Digestive tract parasites found are protozoa and worm eggs. Results of identification of Canines in Bayan Lepas, Penang infected by protozoa are *Isospora* sp. 18% (18/100), *Giardia* sp. 1% (1/100), and worms *Trichuris* sp. 2% (2/100), *Dipylidium* sp. 2% (2/100), *Ancylostoma* sp. 1% (1/100), *Toxocara* sp. 2% (2/100), *Strongyloides* sp. 2% (2/100).

Protozoa *Isospora* sp. and *Giardia* sp. found in a study conducted on 100 Canines in Bayan Lepas, Penang. Oocyst of *Isospora* sp. is oval shaped and contains two sporocysts with four sporozoites within each sporocyst as seen in Figure 1. In addition to *Isospora* sp., there is a cyst of *Giardia* sp., which is in oval-elliptical shape that can be seen in Figure 2.

Figure 1. *Isospora* sp.

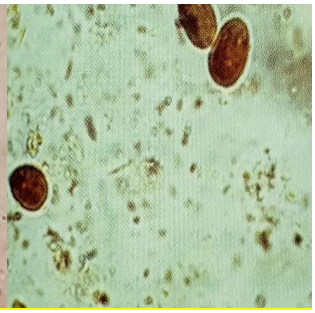

Figure 2. *Giardia* sp.

In the results of the examination of the eggs of the Cestoda class worms, *Dipylidium* sp. was found which can be seen in Figure 3. Eggs of *Dipylidium* sp. Is spherical to oval in shape and contains an oncosphere that has 6 hooks. Proglottid *Dipylidium* sp. has a characteristic in the form of egg sacs that are round and contain 5-15 eggs in each.

Figure 3. *Dipylidium* sp.

The results of the examination also found types of Nematode class worms, including *Trichuris* sp., *Ancylostoma* sp., *Toxocara* sp., and *Strongyloides* sp. Eggs of *Trichuris* sp. has a jar-like shape at both poles there is an operculum as shown in Figure 4. Eggs of *Ancylostoma* sp. is a thin shell

and oval in shape as shown in Figure 5. Eggs of *Toxocara* sp. Is round, has thick shell, and the surface is mottled (uneven) as shown in Figure 6. In Figure 7 as shown in the egg of *Strongyloide*s sp. there is a larval formation and is transparent in color.

Figure 4. *Trichuris* sp.

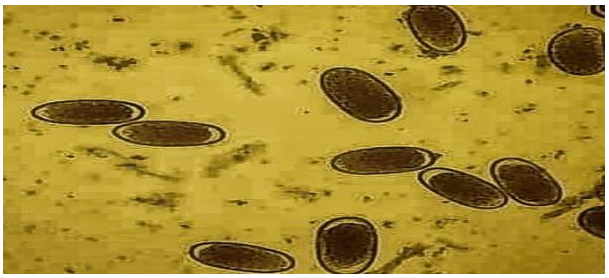

Figure 5. *Ancylostoma* sp.

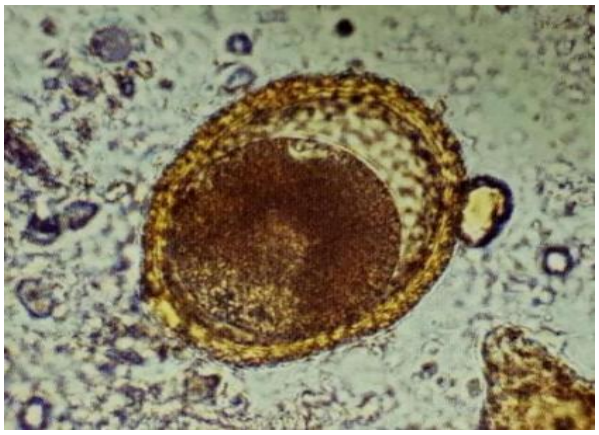

Figure 6. *Toxocara* sp.

Figure 7. *Strongyloides* sp.

Table 1. Infected Parasites of Gastroinstestinal Parasites in Canines in Bayan Lepas, Penang

		Region		
Types of Parasites	**Positive Samples**			
		Sungai Ara	**Relau**	**Batu Maung**
Isospora sp.	18/100 (18%)	8/35 (22.8%)	5/35 (14.2%)	5/30 (16.6%)
Trichuris sp.	2/100 (2%)	1/35 (2.8%)	0	1/30 (3.3%)
Dipylidium sp.	2/100 (2%)	1/35 (2.8%)	1/35 (2.8%)	0
Toxocara sp.	2/100 (2%)	0	2/35 (5.7%)	0
Strongyloides sp.	2/100 (2%)	0	0	1/30 (3.3%)
Ancylostoma sp.	1/100 (1%)	0	1/35 (2.8%)	0
Giardia sp.	1/100 (1%)	1/35 (2.8%)	0	0
Total	28/100 (28%)	11/35 (31.2%)	9/35 (25.5%)	7/30 (23.2%)

According to Table 1 in Sungai Ara region, there are 11 positive samples obtained, which was *Isospora* sp. (22.8%), *Trichuris* sp. (2.8%), *Dipylidium* sp. (2.8%) and *Giardia* sp. (2.8%). In Relau region, there are 9 positive samples that are infected which was *Isospora* sp. (14.2%), *Dipylidium* sp. (2.8%), Toxocara sp. (5.7%) and Ancylostoma sp. (2.8%). In Batu Maung region, there are 7 positive samples of infected parasites which was *Isospora* sp.

(16.6%), *Trichuris* sp. (3.3%), and *Strongyloides* sp. (3.3%).

Prevalence of Gastrointestinal Parasites in Canines in Bayan Lepas, Penang

Based on laboratory examination, 28 samples were positive and 72 samples were negative. Based on the positive results of the fecal examination for digestive tract parasites, the prevalence rate was 28% and negative was 72%. The prevalence of digestive tract parasites in canines in Bayan Lepas, Penang as based on gender, the prevalence rate in males was 29.3% and in females was 26.2%. Sex determination done through direct observation.

The prevalence of digestive tract parasites in dogs in Bayan Lepas, Penang based on age, the prevalence rate at the age of 4-6 years was 30.9% and at the age of 6-8 years was 24.4%. Determination of age based on birth records and the changes of permanent incisors. The prevalence of digestive tract parasites in dogs in Bayan Lepas, Penang, based on the sampling location, was 31.4% in Sungai Ara, 25.7% in Relau, and 26.7% in Batu Maung.

The Effect of Gender and Age on the Prevalence of Gastrointestinal Parasites in Canines in Bayan Lepas, Penang

The results of the analysis of the effect of sex on the prevalence of digestive tract parasites in dogs in Bayan Lepas, Penang using the Chi Test showed the effect of sex on the prevalence of digestive tract parasites obtained a P value of 0.732, which showed insignificant results (P≥0.05). This indicates that gender has no effect on the prevalence of gastrointestinal parasites in dogs in Bayan Lepas, Penang.

The results of the analysis of the effect of age on the prevalence of digestive tract parasites in dogs in Bayan Lepas, Penang using the Chi Test showed that the effect of age on the prevalence of digestive tract parasites obtained a P value of 0.474, which showed insignificant results (P≥0.05). This is stated that age had no effect on the prevalence of gastrointestinal parasites in dogs in Bayan Lepas, Penang.

Discussion

Types of Gastrointestinal Parasites in Canines in Bayan Lepas, Penang

The test results of the laboratory examination, the types of worms found are from the Cestoda and Nematoda classes, as well as protozoas. This supported by a research conducted by Utama *et a*l., (2017) in observing *Toxocara canis* worms in dogs and research by Dharma *et al*., (2017) in observing *Ancylostoma* sp. on dogs carried out in the tourist area of Bali. In addition to these two studies, there are also other studies, namely those conducted by Glantiga *et al*., (2016) research on protozoa on Kintamani Bali dogs in Sukawana Village and Akhira *et al*., (2013) research on nematodes on hunting dogs in Lareh Sago District, Halaban, West Sumatra Province.

Differences in prevalence results in various regions influenced by three factors, namely host, agent, and environment. The existence of the host is relatively directly proportional to the presence of the agent, in other words, the higher the number of dogs in an area, the higher the possibility of the presence of parasites in the dog's body as its host. A polluted environment will facilitate the infective stage of worm larvae and oocysts/protozoal cysts to infect healthy dogs (Dharma *et al*., 2017).

Prevalence of Gastrointestinal Parasites in Canines in Bayan Lepas, Penang

The prevalence of gastrointestinal parasites in dogs in Bayan Lepas, Penang is 28%. The prevalence rate in this study is higher than the research conducted by Utama *et al*., (2017) and slightly lower than the research by Dharma *et al*., (2017) in the tourist area of Bali which reported the prevalence of digestive tract parasites in dogs was 9% of 100 samples and 34% of 100 samples. Parasite prevalence in dogs in Bayan Lepas, Penang caused by intrinsic influences from within the animal's body or extrinsic originating from the environment.

In this study, the prevalence of gastrointestinal parasites in dogs in Bayan Lepas, Penang based on gender was found to be 29.3% in males and 26.2% in females, this indicates the prevalence in male dogs is greater than in female dogs. A high prevalence of infected male dogs also reported in the city of Ambo, Ethiopia at 51.51% in males and 47.37% in female dogs (Endrias *et al*., 2010). In general, male dogs are more sensitive to infection with parasitic worms than female dogs, this is because female dogs have more estrogen hormone than male dogs. The hormone estrogen can stimulate RES cells (*Reticulo Endothelial System*) to form antibodies against worm parasites (Soulsby, 1982).

Prevalence based on age obtained prevalence rates at age 4-6 years of 30.9% and at age 6-8 years of 24.4%, this shows the prevalence at age 4-6 years is slightly higher than age 6-8 years. This not too far difference in prevalence could be due to the fact that in general, animals that are mature or above 1-2 years old have lower body resistance and have a

greater chance of being infested by disease. In contrast, animals with high body resistance have a lower chance of being infested by disease (Akhira *et al*., 2013).

The prevalence of digestive tract parasites in dogs based on the location of the sample obtained in the Sungai Ara by 31.4%, in Relau by 25.7%, and in Batu Maung by 26.7%. The high prevalence in an area can occur because of the different dog maintenance systems in each region and the control of the dog's health.

The Effect of Gender and Age on the Prevalence of Gastrointestinal Parasites in Canines in Bayan Lepas, Penang

The results of the Chi Square Test analysis of the influence of male and female sex and age with categories of 4-6 years and 6-8 years on the prevalence of digestive tract parasites obtained insignificant results (P≥0.05), it states that gender and age differences has no effect on the prevalence of gastrointestinal parasites in dogs in Bayan Lepas, Penang. The results of this study are similar to the research conducted by Utama *et al*., (2017) and Dharma *et al*., (2017) to dogs in the tourist area of Bali who reported that there was no significant relationship between age, gender, or type of race and system maintenance of dogs against the prevalence of gastrointestinal parasites.

The results of the analysis showed that there was no significant difference between sex and age on the prevalence of digestive tract parasites in dogs in Bayan Lepas, Penang. This indicated that all male and female dogs aged 4-6 years or 6-8 years had the same great opportunity to be infected.

Conclusion and Suggestion

The conclusions from the results of research on the Identification Prevalence of Endoparasite in Canines Bayan Lepas, Penang are:

1. Types of digestive tract parasites in canine Bayan Lepas, Penang are *Trichuris* sp. 2% (2/100), *Dipylidium* sp. 2% (2/100), *Ancylostoma* sp. 1% (1/100), *Toxocara* sp. 2% (2/100), *Strongyloides* sp. 2% (2/100) ,*Isospora* sp. 18% (18/100), and *Giardia* sp. 1% (1/100).
2. Prevalence of digestive tract parasites on Canines in Bayan Lepas, Penang is 28%.
3. Sex and age have no effect on the parasite prevalence digestive tract of Canines in Bayan Lepas, Penang.

Based on the research results, the following suggestions should be made:

1. Need a counseling program to educate the community of Bayan Lepas to maintenance management such as housing, giving feed, and drink as well as sanitation so that infection with intestinal parasites digestion can be prevented.
2. It is necessary to control for parasitic disease control, therefore in future studies, research should be carried out on the types and doses of drugs to treat cases in Canines that were infected with parasite infestations.

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