UNIVERSITI PUTRA MALAYSIA

SURVEY ON PET OWNERS AWARENESS ABOUT PARASITIC DISEASES IN CATS AND DOGS AND THE PREVENTIVE MEASURE IN KLANG VALLEY

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SURVEY ON PET OWNERS AWARENESS ABOUT PARASITIC DISEASES IN CATS AND DOGS AND THE PREVENTIVE MEASURE IN KLANG VALLEY

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CERTIFICATION

It is hereby certified that we have read this project paper entitled "Survey on Pet Owners Awareness about Parasitic Diseases in Cats and Dogs and The Preventive Measure in Klang Valley", by Nurafiqah Binti Ahmad and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Project

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DEDICATIONS

This project paper is dedicated to the Allah One Almighty God, who had created me and made all things possible,

To my family,

Father

Mother

Brother, Sister

To my friends,

Best friends

DVM 2016

And to all my lecturers who have committed themselves towards the noble cause of education.

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LIST OF ABBREVIATIONS

%	Percent
RM	Ringgit Malaysia
=	Same as
S.P.S.S	Statistical Package for Social Sciences
CLM	Cutaneous Larva Migrans
OLM	Ocular Larva Migrans

ABSTRACT

SURVEY ON PET OWNERS AWARENESS ABOUT PARASITIC DISEASES IN CATS AND DOGS AND THE PREVENTIVE MEASURE IN KLANG VALLEY

By

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2016

Supervisor: Dr. Puteri Azaziah Megat Abdul Rani

A cross-sectional study on level of pet owner awareness about cat and dog parasitic diseases and the preventive measure on Klang Valley was conducted from11th January to 31st January 2016. A random sampling was done to get 150 respondents who consulted from ten private veterinary clinics in Klang Valley area. A set of closed-ended structured questionnaire was designed for the study which includes client and pet profile and questions about knowledge about parasitic diseases and preventive medicine in cats and dogs. All data was collected in Microsoft Excel and analysed using S.P.S.S Version 12.0 for descriptive and analysis statistics. The awareness of pet owner about parasitic diseases and preventive medicine of cats and dogs were determined by their score from the questionnaire itself. From the descriptive analysis, 74% of the respondents were aware about parasitic diseases; whereas only 67% of the respondents awee aware about parasitic zoonosis. However, only 33% of the respondents were aware about preventive medicine such as deworming, ectoparasite control, and heartworm

prevention medicine. In analytic analysis, Chi Square test was done to determine the association between educational status and the level of awareness of the respondents. The Chi Square test revealed that educational level have a significantly different to level of awareness of parasitic diseases but not statically significant with level of awareness of preventive medicine and parasitic zoonosis. In conclusion, majority of the pet owner still do not understand and aware about parasitic zoonosis. Thus many ways should be done to educate pet owners about parasitic zoonosis for both their knowledge and health.

Keywords: *Parasitic zoonosis, Chi square, preventive medicine*.

ABSTRAK

KAJIAN MENGENAI KESEDARAN DALAM KALANGAN PEMILIK HAIWAN MENGENAI PENYAKIT PARASIT KUCING DAN ANJING DAN PERUBATAN PENCEGAHAN DI KAWASAN LEMBAH KLANG.

Oleh

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2016

Penyelia : Dr. Puteri Azaziah Megat Abdul Rani

Satu kajian keratan rentas mengenai tahap kesedaran pemilik haiwan tentang penyakit parasit kucing dan anjing dan perubatan pencegahan di Lembah Klang telah dijalankan daripada 11 Januari hingga 31 Januari 2016. Persampelan secara rawak dilakukan untuk memilih 150 responden yang hadir ke sepuluh klinik veterinar swasta di kawasan Lembah Klang. Borang soal selidik yang berstruktur tertutup yang merangkumi tentang profil responden, haiwan kesayangan dan penyakit haiwan kesayangan telah diedarkan kepada responden. Semua data dikumpulkan dalam Microsoft Excel dan analisis data menggunakan S.P.S.S Versi 12.0 untuk statistik deskriptif dan analisis. Kesedaran pemilik haiwan kesayangan tentang penyakit parasit dan perubatan pencegahan kucing dan anjing ditentukan oleh skor mereka daripada soalan didalam borang soal selidik.Daripada analisis deskriptif, 74% daripada responden sedar mengenai penyakit parasit; manakala hanya 67% daripada responden mengetahui mengenai zoonosis parasit. Walau bagaimanapun, hanya 33% daripada responden mengetahui tentang perubatan

pencegahan seperti nyah cacing, kawalan ectoparasite, dan perubatan pencegahan cacing jantung.Dalam analitik analisis, ujian Chi Square telah dilakukan untuk menentukan hubungan antara tahap pendidikan dan tahap kesedaran responden. Ujian Chi Square menunjukkan bahawa tahap pendidikan mempunyai perbezaan yang signifikan kepada penyakit parasit tetapi tidak signifikan terhadap perubatan pencegahan dan penyakit zoonosis. Kesimpulannya, majoriti pemilik haiwan masih tiada kesedaran tentang parasit zoonotik. Terdapat banyak cara untuk mengajar pemilik haiwan tentang parasit zoonosis untuk pengetahuan dan kesihatan mereka.

Keywords: *Parasitik zoonotik, Chi Square, Perubatan pencegahan.*

Chapter 1

INTRODUCTION

1.1 General introduction

In Malaysia, dogs and cats are the most common animals that kept as pets. They are usually kept for house protection, companionship, breeding, assisting handicapped individual and others purposes.

Malaysia experience hot and humid climate all year round, which provides a very conducive environment for parasite optimum life cycle (Peter Irwin et al. 2006). The most common ectoparasites infesting cats and dogs in Malaysia are fleas, mites, lice, and ticks; whereas hookworm, roundworm, tapeworm and heartworm are the most common endoparasites in cats and dogs.

However, the close contact between companion animals with their owner may expose the pet owner to zoonotic diseases from their pets. Some parasitic zoonosis from cats and dogs can be transmitted via faecal-oral route or ingestion of food or water that have been contaminated with parasitic zoonosis agent, or the ectoparasites acting as vector of other diseases.

A recently done by Izzati (2013), showed 52.1% (n=69) of domestic cats in both urban and rural area in Kuching, Sarawak have been infected with at least one species of ectoparasites. Another study that showed high prevalence of gastrointestinal parasites infection in both cats (89.3%, n= 28) and dogs (88.3%, n=78) in rural area of Selangor and Pahang (Romano Ngui et al., 2011). The high

prevalence of parasitic infection in small animal in Malaysia leading to an assumption that awareness about parasitic diseases in pets are still low.

Preventive medicine in cats and dogs is very crucial to prevent parasitic diseases especially those that are zoonotic as it is a public health concern. Thus parasitic control such as deworming and heartworm prevention are highly recommended as part of pets' wellness program for life. To date, no reports on pet owner awareness about parasitic prevention, and parasitic diseases especially parasitic zoonosis in Malaysia.

Thus this study was conducted with the several objectives:

- To determine the level of awareness among pet owners about parasitic disease in pets.
- To determine level of awareness among pet owners about the parasitic preventive measures.
- To determine the level of pet owner's general knowledge about the parasitic zoonosis in cats and dogs.

1.2 Hypothesis statement

This study has two hypotheses;

1. Null hypothesis (Ho1): Percentage of pet owner aware about parasitic disease, parasitic preventive measure, and parasitic zoonosis are more than percentage of pet owner who do not aware about it.
2. Null hypothesis (Ho2): There is no association between educational status and awareness of pet owner regarding parasitic diseases, parasitic preventive medicine and parasitic zoonosis.

Chapter 2

LITERATURE REVIEW

There are many parasitic diseases that can infect cats and dogs. According to Izzati (2013), the most common ectoparasites that can be seen in cats and dogs are *Felicola* sp., *Sarcoptes scabiei, Notoedes cati* and *Ctenocephalides felis;* whereas the prevalence of endoparasite infection in dog is 88.3% (n=77) and 89.3% (n=28) in cats were infected with at least one parasites species, respectively. The common endoparasites species in cats and dogs are *Ancylostoma* spp., *Toxocara* spp., *Trichuris vulpis, Spirometra* spp., *Toxascaris* spp., *Dipylidium caninum, Ascaris* spp. and others (Romano Ngui et al. 2014).

2.1 Ectoparasites

Ectoparasites are one of the most important causes of dermatology lesions in cats and dogs (45.6%, n=103) and there are many risk factors can be contributed to infestation of ectoparasites such as in small- sized dog with body weight less than three kilograms, young dog which less than one year old are more highly to get heavily ectoparasites infestation (Chee *et al.*, 2008).

The most common ectoparasite infestations among stray dogs in Tehran, Iran are ticks (36.4%, n=143), fleas (29.4%, n=143), mites (25.9%, n=143), and lice (8.4%, n=143) and mixed infestation of ectoparasites is not really common in dogs (Jamshidi *et al.*, 2012). Besides that, the most common species of ectoparasites that found in stray dogs are *Otodectes cynotis* was (22%, n=103), followed by *Sarcoptes*

scabiei (19.4%, n=103), *Ctenocephalides canis* (6.8%, n=103), *Demodex canis* (4.9%, n =103), and *Trichodectes canis* (1.0%, n =103).

2.2 Endoparasites

According to Mohammed *et al.*, 2012, there is a high prevalence of hookworm (48%, n=221) among stray dogs in Malaysia detected by fecal examination from both rural and urban stray dogs in Selangor. From the positive hookworm infection of the stray dogs, rural area stray dogs have high prevalence (71.4%, n=221) compared to urban stray dogs. In addition, the positive hookworm samples, polymerase chain reaction (PCR) was done and hookworms been isolated were *Ancylostoma ceylanicum* and *Ancylostoma caninum* which shown that human that have in contact with stray dogs may have high risk of hookworm-related CLM.

2.3 Ectoparasite prevention

Ectoparasites prevention also known as external anti-parasitic drugs which refers to all drugs that are effective to kill ectoparasites. It usually been used as prophylaxis to prevent associated clinical signs of the ectoparasites infestation and may be used as treatment to alleviate discomfort, and prevent ectoparasites bites and infestation. According to Beugnet *et al.*, (2012), external anti-parasitic drug have few active ingredients such as insecticides, pulicides or adulticides, and acaricides.

For cases of mites infestation such as *Demodex*, *Otodectes*, *Cheyletiella*, *Sarcoptes,* and *Notoedres spp,* usually cats and dogs are only treated with external antiparasitic drugs for short period protection against ectoparasites after diagnosis of infestation. However, for infestation of fleas, ticks, and lice, they may shows clinical

signs such as alopecia, itchiness, and dermatitis; thus external antiparasitic drugs are given as both treatment and prophylaxis drugs for long acting protection of ectoparasites. The external antiparasitic drugs are usually used directly by application or topically on the animal's body.

2.4 Deworming protocol

Endoparasites especially gastrointestinal parasites have a high prevalence causing infection with at least one gastrointestinal parasite in both cats (89.3%, n=28) and dogs (88.3%, n=77) in rural dogs and cats (Romano Ngui et al., 2003). Several gastrointestinal parasites in cats and dogs are recognized to be a zoonotic agents and it may increase public health risk. Thus prevention measure such as deworming should be taken aggressively to reduce the prevalence rates of endoparasitic infection and cats and dogs.

According to Stull et al.,(2003), the recommended and considered appropriate age for the first deworming if complying with established guidelines are less than three weeks for puppies and less than six weeks for kittens. In this study, 545 veterinarians in Canada as respondents and sixty-six (13.2%) of the veterinarians recommended less than three weeks for the first deworming and more than three treatments of deworming during the first 16 weeks of life of puppies. Similarly in kittens, one hundred and ninety-seven (38.9%, n=545) veterinarians recommended the first deworming of kittens should started at less than six weeks of age and more than three treatments of deworming during the first sixteen weeks of kitten life.

2.5 Heartworm prevention

According to Kalkstein *et al.,* (2000), 25 out of 1348 samples (1.9%) of healthy cats were observed to have positive in antigen detection test for heartworm infection in the Lower Peninsula of Michigan. All the samples were physically healthy based on physical examination, and have not received any heartworm preventive medicine. In addition, majority of the positive cats in antigen detection test, were age more than two years old and managed indoors.

2.3 Zoonotic parasitic disease

Zoonosis has been defined as diseases that are transmissible from vertebrate animals to humans and vice-versa. Zoonosis can be caused by many pathogens such as parasites, bacteria, fungi, and also viruses according to the Eng *et al.,* (1989). For parasitic zoonosis, it can be divided into direct contact, waterborne, foodborne parasitic zoonosis especially meat-borne transmission. However, the most common parasitic zoonosis for both animal and human especially pet owner is intestinal parasitic zoonosis such as Ancylostomiasis, Giardiasis, Toxoplasmosis, Toxocariasis, and Dipylidiasis.

Figure 1: Skin lesion cause by burrowing larvae of *Ancylostoma spp.* in Cutaneous Larva Migrans (CLM)

Figure 2: A child with *Toxocara canis* parasites wander to the eyes (Ocular larva migrans)

Figure 3: Rash in hand due to infection of *Sarcoptes scabie* in human.

Figure 4: Congenital toxoplasmosis

CHAPTER 3

MATERIALS AND METHOD

3.1 Study Design

A cross-sectional study on level of pet owner awareness on cat and dog parasitic diseases and its preventive measures was conducted from11th January to 31st January 2016. For this study, subjects selected were owners of cats and dogs in Klang valley.

3.2 Target and study population

The target population for this study were cat or dog owner in variable ages and gender who consulted small animal veterinary clinics in Klang valley area including Seri Kembangan, Bangi, Kajang, Petaling Jaya, Subang Jaya, Shah Alam, Damansara and Kuala Lumpur. A total of 150 respondents were selected.

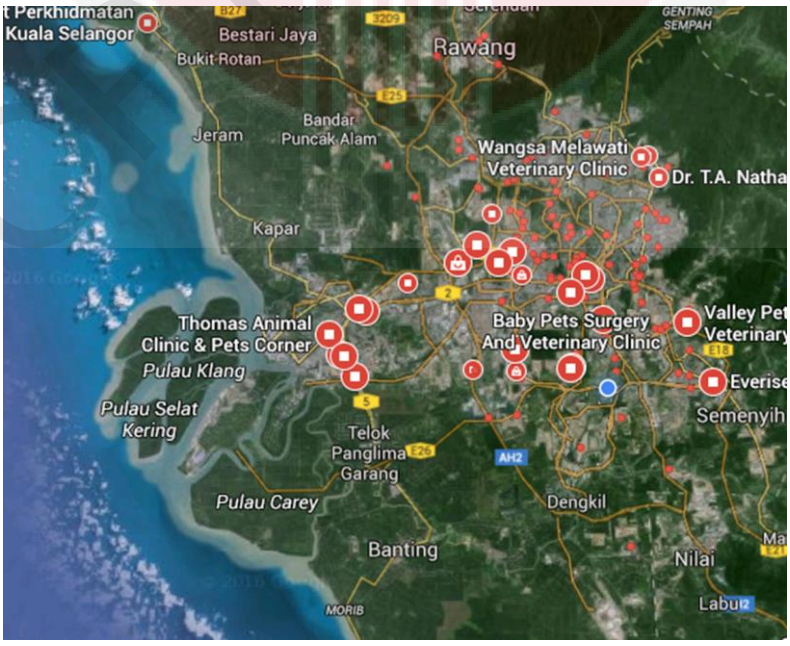

Figure 5: Location of study area (Klang Valley)

3.3 Sampling

A random sampling was performed to select respondents who consulted from ten private veterinary clinics in Klang valley area (Appendix). Ten districts from Klang valley were randomly selected and two small animal veterinary clinics in each district in Klang valley were randomly selected and identified. Phone calls and letters for permission to conduct a survey in their clinics were sent to each of the selected private veterinary clinics.

3.4 Questionnaire

Two sets of closed-ended structured questionnaire was designed for the study (Appendix B and C) in both English and Malay languages. A total number of thirty-eight questions were set. All thirty-eight questions comprised of five sections as follows:

Section A: Client's profile

Section B: Pet's profile

Section C: General pet health care

Section D: Client's general knowledge about preventive measure

Section E: Client's general knowledge about parasitic zoonosis

3.5 Questionnaire administration

Some questionnaires were delivered by hand to the pet owner who visited the participating small animal veterinary clinics. All pet owners in the clinics were

approached and asked if they willing to participate in this survey before the questionnaires were given. Some of the questionnaires were distributed to the small animal veterinary clinics around Klang valley for their clients to fill in the questionnaire. The questionnaires were collected after a week of time period. Each of the respondents was given bookmarks and pen as a souvenir after finished answering all five sections of the questionnaires.

3.6 Data collection and analysis

All data variables in the questionnaires were collected in Microsoft Excel and data editing was done for the new variables such as pet owner awareness regarding parasitic diseases, parasitic preventive medicine and parasitic zoonosis of cats and dogs. Next, data was analysed using Statistical Package for Social Sciences or S.P.S.S Version 12.0 for Windows through descriptive statistics. The frequencies and percentages of the individual questions were obtained. Next, the Chi Square test was done to identify the difference between educational status and awareness of the pet owner about parasitic diseases, preventive medicine, and parasitic zoonosis of cats and dogs.

CHAPTER 4

RESULTS

A total of one hundred and fifty small animal veterinary clinic clients who visited ten small animal veterinary clinics in Klang Valley responded to the questionnaires. There are fifteen clients participated from each one of the clinic.

4.1 Population Demography

Out of 150 respondents, 33.3% were male clients and the other 66.7% were female clients. (Figure 6).The respondents aged between 14 years old to 67 years old and the majority of the respondents are adults (81.3%) who aged between 21 years old to 59 years old, 17.3% are teenager who aged less than 21 years old, and 1.3% of the respondents are senior citizen who aged more than 60 years old (Table 1). Majority of the respondents have undergone tertiary education which includes diploma, degree, master and PHD (82%), 18% had a secondary education which is from the secondary high school (Table 2).

On the other hand, only 34.7% of the respondents were employed, whereas other 65.3% of the respondents were unemployed (Table 3). Estimation of the monthly income were summarised in Table 4. Majority of the respondents were earning from RM0 to RM2000 per month (48.7%) which include commonly undergraduate students and high school students. Thirty-eight percent of the respondents earn RM2001-RM5000 per months and only 13.3% earn more than RM5000 per month. Besides that, majority of the respondents (50.7%) have been keeping their pets more than six years, the other 34.7% of the respondents have been

keeping their pets in one to five years and other 14.7% of the respondents have been keeping pets less than one year (Table 5).

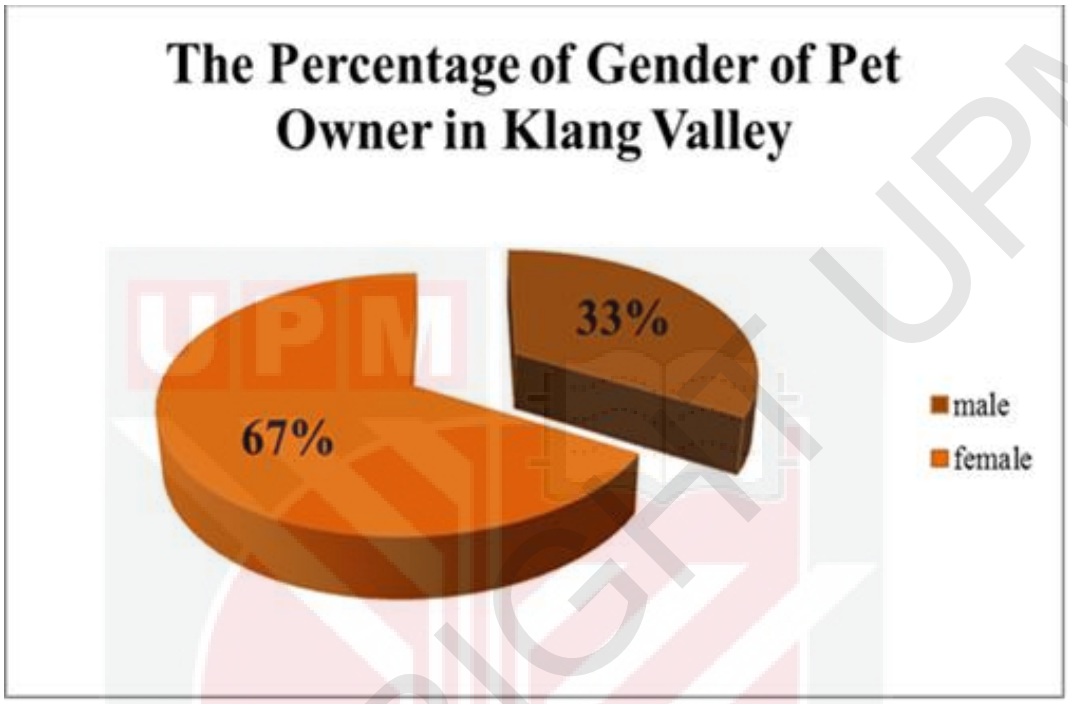

Figure 6: The percentage of pet owner's gender as the respondents.

4.2 Pet's Profile

Seventy-one percent of the respondents only kept cat in household, twenty-four percent of the respondents kept only dog in household, and five percent of the respondents kept both cat and dog in household (Table 6).

For cat owner respondents, 29.8% of them only have one cat at home, whereas other 70.2% have more than one cats at home (Table 7). For dog owner respondents, 39.5% of the dog owner has only one dog at home, whereas the other 60.5% of the dog owner have more than one dog at home (Table 8).

4.3 General Pet Health Care

4.3.1 Management

Out of 150 respondents, 39.3% kept their cat and dog indoor, 19.3% of the respondents kept their pet outdoor and 41.3% of the respondents kept their pets in both indoor and outdoor (Table 9). Besides that, majority of the pet owner bath their pet once in a month (34%), twenty-seven percent of the respondents bath their pets once a week, fifteen percent of the respondents bath their pets two times in a month, fourteen percent of the respondents claimed that they never bath their pets, and five percent of the respondents bath their pet three times a month and another five percent only bath their pets sometimes (Table 10).

4.3.2 Health Care

For deworming, twenty percent of the respondents do not deworm all of their pets, 21.3% of the respondents only deworm some of their pets and the other 58.7% of the respondents dewormed all of their pets (Table 11). In addition, 11.3% of the pet owners never bring their pet for deworming, 17.3% of the pet owner bring their pet to be dewormed for at least once in three months, 19.3% of respondents bring their pets at least once in six months for deworming, 20.7% of respondents bring their pet once a year, and 31.3% of the respondents only sometimes bring their pets for deworming (Table 12).

For ectoparasites, sixty-six percent of the respondents do not see ticks or flea on their pets but thirty-four percent of the respondents claimed that they have seen tick or flea on their pets body (Table 13). However, only sixty-eight percent of the pet's respondents are on ectoparasite prevention whereas the other thirty-two of the pets do not on ectoparasite prevention (Table 14).

In addition, sixty percent of the respondents get their pet vaccinated whereas the other forty percent of the respondent do not get their pets vaccinated. However, only fifty-two percent out of sixty percent of the respondents follow the vaccination regime, the other eight percent of the respondents do not follow the regime of vaccination (Table 15).

Furthermore, there are only thirty-three percent of the pet owner get heartworm prevention on their cat and dog, whereas sixty-seven percent of the other pet owner do not get any heartworm prevention to their pets (Table 16).

4.4 Pet owner awareness about parasitic diseases in cat and dog

In awareness of parasitic diseases in cats and dogs, we have given the respondents eight statements about parasitic disease in pets in the questionnaires. The respondents are given three choices which to agree, disagree or tick do not know about the statements. The statements are all true statements. The level of awareness about parasitic diseases in the cats and dogs is categorised as aware if the respondents score 6 to 8, moderately aware if the respondents score 4-5, and not aware if the respondents score 3-0 of the statements. The respondents will get score only if the respondents agreed with statements.

Majority of the respondents are aware about parasitic diseases in the cats and dogs (73.3%), 15.3% of the respondents are moderately aware about the parasitic diseases and only 11.3% of the respondents do not aware about parasitic diseases in cats and dogs. Chi square test was done and shows that the differences of frequencies between level of awareness about parasitic diseases are statistically significant (P value= 0.000) (Table 17).

Furthermore, the Chi-Square test was done between education status and the level awareness of parasitic disease of pets and the difference was statistically significant [$\chi 2$ (2) = 6.160, P=0.046]. This concluded that the education status do play a significant role in determining the level of awareness

4.5 Pet owner awareness about parasitic preventive medicine against parasitic diseases in cat and dog

In awareness of the preventive medicine of parasitic diseases in cats and dogs, we have given questions to the respondents if they are aware about deworming, ectoparasite preventive, and heartworm prevention medicine. We also asked if their pet are dewormed or not and if they know when their pets can be dewormed. The level of awareness of preventive medicine for parasites in cats and dogs is categorised as aware if the respondents claimed that they are aware and their pets have been dewormed, have given ectoparasite prevention and heartworm prevention which score 3 out of 3, the respondents are categorised as moderately aware if they score 1 to 2 out of 3, and do not aware if the respondents score 0 out of 2 questions.

Majority of the respondents (54%) are moderately aware about parasitic preventive medicine, 32.7% of the respondents are aware, and only 32.7% of the respondents are not aware. The differences of frequencies between level of awareness of preventive medicine of pets are statistically significant using Chi Square test with P-value= 0.000 (Table 18).

However, the difference was not statistically significant between education level and the level of awareness about preventive medicine in pets [$\chi 2$ (2) = 2.524,

P=0.238]. Thus this concluded that education status not play significant role to awareness about preventive medicine of parasite in pets.

4.6 Pet owner awareness about parasitic zoonosis in cats and dogs

In awareness of the parasitic zoonosis in cats and dogs, we have given question to the respondents if they are understand what exactly the meaning of zoonosis. We also asked the respondents five types of parasitic zoonosis such as hookworm, roundworm, tapeworm, toxoplasmosis and scabies. The respondents need to answer if they know about, or have an experienced or their pet have experienced the zoonotic diseases. The respondents will be categorized as aware if they understand what is zoonosis and know at least more than four common parasitic zoonosis, moderately aware if they understand zoonosis and know at least one to three parasitic diseases, not aware if they do not understand zoonosis.

Out of five common parasitic zoonosis, the most known diseases as zoonosis by pet owner are scabies (58%), tapeworm (55.3%), roundworm (50%), and hookworm (48%), and toxoplasmosis (35.3%).

Majority of the respondents are not aware about parasitic zoonosis (67.3%), twelve percent moderately aware, and 20.7% of the respondents are aware of parasitic zoonosis. The differences of frequencies between level of awareness of zoonosis are statistically significant using Chi Square test with P-value= 0.000 (Table 19). However, the difference between educational status and pet owner awareness was not statically significant [$\chi 2$ (2) = 5.713 , P=0.057]. Thus this concluded that education status not play significant role to awareness about parasitic zoonosis in cats and dogs. The percentage of the awareness of pet owner about

parasitic diseases, preventive medicine and zoonosis in cats and dogs are summarized in Figure 7.

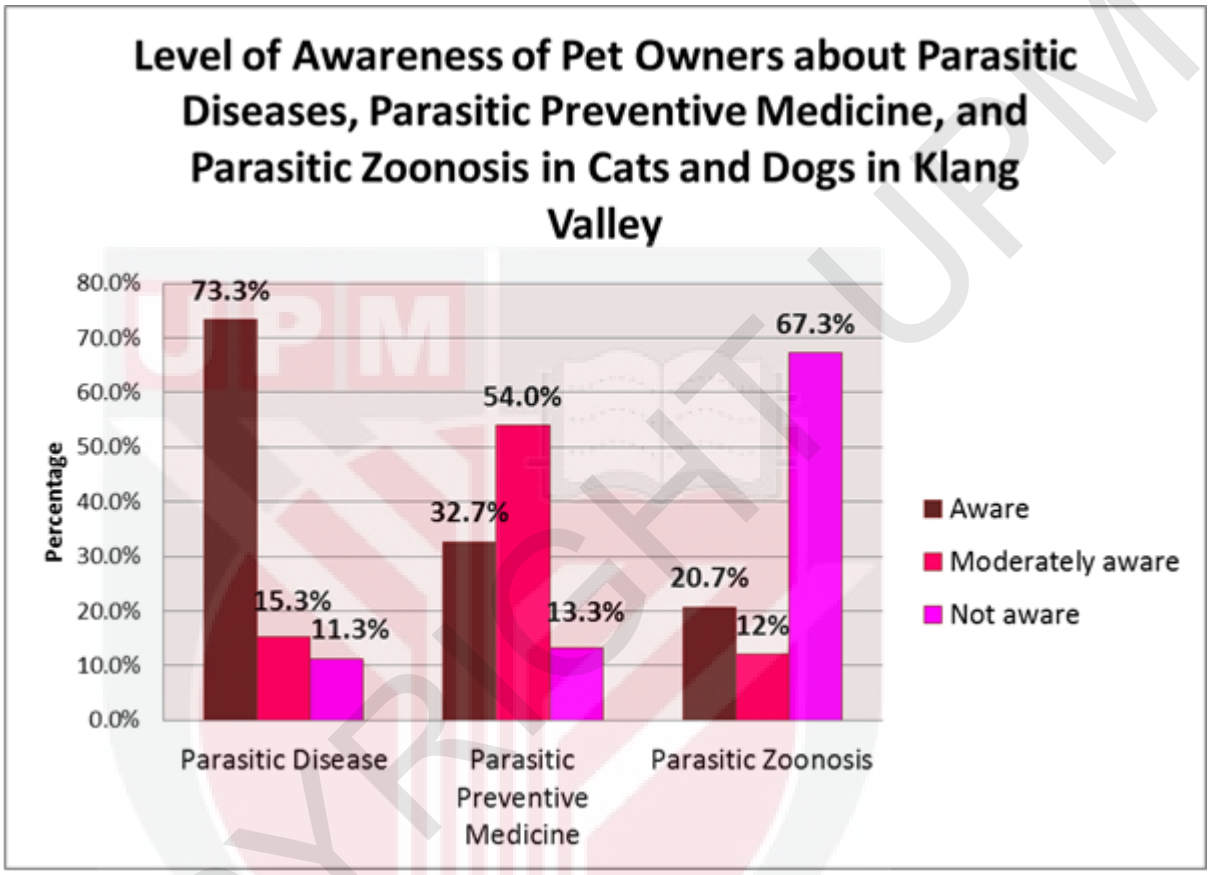

Figure 7: Percentage of the respondents according to the awareness about the parasitic diseases, preventive medicine, and zoonosis of cats and dogs

4.7 Respondent source of information about parasitic disease, preventive medicine, and parasitic zoonosis in cats and dogs

The respondents who are claimed that they are aware about deworming were asked where they get the information about the preventive medicine. For deworming information, seventy-five percent of the pet owner get the deworming information from veterinarian, 2.3% get from articles or newspapers, 1.5% get from pet

magazine, 11.3% get from the internet, and 9.8% get from friends or family (Table 20).

In addition, forty-six percent from the pet owner claimed that they know about heartworm prevention of cats and dogs. Eighty percent of the respondents get the information from the veterinarian, 1.4% from articles or newspaper, 7.1% from the internet, and 11.4% from their friends and family (Table 21).

Besides, fifty-two percent from the pet owner claimed that they know and understand about zoonotic disease of cats and dogs. 62.8% of the respondents get the information from the veterinarian, 7.7% from articles or newspaper, 2.6% get from pet magazine, 17.4% from the internet, 1.3% from media mass and 7.7% from their friends and family (Table 22).

CHAPTER 5

DISCUSSION

5.1 Level of general pet health care

General pet health care includes the management and health care of the cats and dogs provided by their owners.

Majority of the respondents kept their pets as semi-roamer (41%). Next, majority of the respondents (68%) have given ectoparasite control to their pets.; However, only 59% of the respondents dewormed all their pets and 31% of the respondents dewormed their pets only when they are free to bring their pets to veterinary clinics. With regards to vaccination, 60 % of respondents have vaccinated their pets but from that, only 58% follow vaccination regime. These evidence are highly suggesting that the general pet health care of cats and dogs in Klang Valley are still in moderate level.

5.2 Level of awareness of parasitic disease, parasitic preventive medicine, and parasitic zoonosis in cats and dogs.

For parasitic diseases awareness, we determined the level of awareness according to the respondent's general knowledge about parasitic diseases including the transmission and source of parasitic diseases in cats and dogs. It represents the level of awareness about parasitic diseases among pets owner in Klang Valley area.

From this study, majority (73.3%) of the respondents are aware about the parasitic diseases as they score 6 to 8 about general knowledge in parasitic diseases. This finding is relevant as majority of the respondents (82%) have higher education

level which is tertiary education of the respondents. In addition, the Chi Square test also shown that educational status has a significant association with level of awareness among pet owner regarding parasitic diseases in cats and dogs. It also shows that higher educational level pet owner aware about parasitic diseases according to cross tabulation. This finding is also consistent with other research reported that only 33.3% of the pet owners do not have knowledge of possible infection sources of parasitic diseases in cats and dogs; whereas the other 66.7% of the pet owners are aware about that (Matos *et al*., 2013).

Regarding the awareness of parasitic preventive medicine, we determined the level of awareness according to the respondent's knowledge about parasitic preventive medicine and the preventive medicine status of their pets' especially deworming, ectoparasite control, and heartworm prevention. From the study, majority (86.7%) of the pet owners are aware about parasitic preventive medicine as majority of the pet owners did provide dewormer (80%) and ectoparasite control (68%) to their pet but only 33% of the pet owner gave heartworm prevention to their pets. It shows that pet owner in Klang Valley well aware about parasitic preventive medicine but still lack of awareness about heartworm prevention in cats and dogs. This finding also consistent with other study reported that majority of pet owner (96.7%) in Lisbon, Portugal provide endoparasite prophylaxis to their pets, 91% of dog's owner and 62% of cat's owner gave ectoparasite control to their pets (Matos *et al.,* 2013).

The levels of awareness on parasitic zoonosis were determined according to the respondent understanding about parasitic zoonosis and the knowledge about the

common parasitic zoonosis in cats and dogs. From this study, only 32.7% of the pet owners were aware about parasitic zoonosis; whereas 67.3% of the pet owners do not know about zoonosis. This finding is contradicting with other study reported by Meijer et al., 2012 in Curaçao; 53% out of 300 pet owners knew about zoonosis. There is also research reported that 85% out of 312 pet owners knew what is zoonosis.

From these findings, it shows that pet owner in Klang valley, Malaysia have a limited knowledge and awareness about parasitic zoonosis if compared to pet owner in other country. Thus pet owner should be informed and educate in order to create awareness in pet owners and reduce risks of getting infected with zoonosis.

5.3 Source of information about parasitic zoonosis, and parasitic preventive medicine among pet owner.

For awareness about parasitic preventive medicine and parasitic zoonosis, educational levels of pet owner do not have any significant association with the pet owner awareness. However, it is important to create awareness among pet owner to limit the risks of getting infected with zoonosis. This study revealed that veterinarian is the most common source of information about parasitic preventive medicine (75%) and parasitic zoonosis (62%) when asked the aware pet owners.

There are also some research reported that both veterinarian and government need to work together to reduce prevalence and incidence of parasitic zoonosis and improve public health by informing people about parasitic zoonosis.

6.0 Conclusion

In conclusion, majority of pet owner in Klang Valley are aware about parasitic diseases (88.6 %) and parasitic preventive medicine (86.7%) in cats and dogs. However majority of them do not aware about parasitic zoonosis (32.7%) in cats and dogs.

In addition, educational level of the pet owner in Klang Valley only has significant association with awareness of parasitic diseases in cats and dogs.

7.0 Recommendation

Firstly, from this study, it shows that pet owner in Klang Valley have low awareness about parasitic zoonosis. In addition, the main source of information about parasitic zoonosis among aware respondents is veterinarian thus client education should be improved. Veterinarian is also recommended to educate pet owners in preventing infection especially parasitic diseases by complying with parasitic preventive medicine for cats and dogs.

Next, this study is recommended to be conducted in future with larger number of sample size and include respondents from all states of Malaysia to represent Malaysian pet owner awareness regarding parasitic preventive medicine and parasitic diseases especially those that are zoonotic.

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9.0 APPENDICES

8.1 List of Small Animal Veterinary Clinics that involved in this study;

1) Animed Veterinary Center
2) Bandar Puteri Veterinary Clinic & Surgery
3) Bukit Tinggi Animal Clinic
4) Heshmael's Clinic For Pets Sdn. Bhd
5) Honeyvets Veterinary Clinic
6) Kucing Desa Veterinary Clinic
7) Lim & Loo Veterinary Clinic Seri Kembangan
8) Mayo Veterinary Clinic & Surgery
9) Pets for me Veterinary Clinic
10) Qaimeera Veterinary Clinic
11) Reliance Veterinary Clinic & Surgery
12) Ruby Pets Clinic
13) Segar Pets Centre & Veterinary Services
14) Subang Jaya Veterinary Clinic
15) Taman Equine Veterinary Clinic & Surgery
16) Thomas Animal Clinic & Pet Corner,
17) University Veterinary Hospital (UVH), Universiti Putra Malaysia
18) USJ Animal Clinic
19) Yeoh Veterinary Clinic &Surgery
20) Pets For You Veterinary Clinic

9.2 Tables from results;

Table 1: Age of the respondents

Age	**Percentage**
Teenager	17.3%
Adult	81.3%
Senior citizen	1.3%

Table 2: Education status of the respondents

Education status	**Percentage**
Primary education	0 (0%)
Secondary education	27 (18%)
Tertiary education	123 (82%)

Table 3: Employment status of the respondents

Employment status	**Percentage**
Employed	52 (34.7%)
Unemployed	98 (65.3%)

Table 4: Financial status of the respondents

Financial status	**Percentage**
RM0-RM2000	73 (48.7%)
RM2001-RM5000	57 (38.0%)
More than RM5001	20 (13.3%)

Table 5: Estimation of duration of pet owners have been keeping pets

Duration of keeping pets	**Percentage**
Less than a year	22 (14.7%)
1 year to 6 years	52 (34.7%)
More than 6 years	76 (50.7%)

Table 6: Species of pets the respondents have at household.

Species	**Percentage**
Cats only	107 (71.3%)
Dogs only	36 (24%)
Cats and dogs	7 (5%)

Table 7: Number of cats the cat owner has at home

Number of cats	**Percentage**
Single cat	34 (29.8%)
Multiple cat	80 (70.2%)

Table 8: Number of dogs the dog owner has at home

Number of dogs	**Percentage**
Single dog	17 (39.5%)
Multiple dog	26 (60.5%)

Table 9: Place the respondents kept their pets at household

Place	**Percentage**
Indoor only	59 (39.3%)
Outdoor only	29 (19.3%)
Indoor and outdoor	62 (41.3%)

Table 10: Frequency of the respondents bath their pets per month

Frequency of bathing pets	**Percentage**
Never	20 (14%)
Once in a month	51 (34%)
Twice in a month	22 (15%)
Three times in a month	8 (5%)
Four times in a month	41 (27%)
Sometimes	8 (5%)

Table 11: Deworming status of the cats and dogs

Deworming status	**Percentage**
None of their pets are dewormed	30 (20%)
Some of their pets are dewormed	32 (21.3%)
All of their pets are dewormed	88 (58.7%)

Table 12: Frequency the pet owner bring their pet for deworming

Deworm	**Percentage**
Never	17 (11.3%)
Once in three months	26 (17.3%)
Once in six months	29 (19.3%)
Once in a year	31 (20.7%)
Sometimes	47 (31.3%)

Table 13: Pet owner observation of tick or flea on their pet's body

Tick or flea	**Percentage**
Have seen	51 (34%)
Never seen	99 (66%)

Table 14: Pets that have been received ectoparasite prevention medicine

Ectoparasite prevention	**Percentage**
Yes	102 (68%)
No	48 (32%)

Table 15: The vaccinated pet's regime

Regime	**Percentage**
Follow the regime	78 (52%)
Do not follow the regime	72 (48%)

Table 16: The number of pets that have been on heartworm prevention

Heartworm prevention	**Percentage**
Yes	49 (33%)
No	101 (67%)

Table 17: Level of awareness about parasitic diseases in cats and dogs

Level of awareness	**Percentage**
Aware	110 (73.3%)
Moderately aware	23 (15.3%)
Do not aware	17 (11.3%)

P value =0.000 which is less than α-value(0.05).

Table 18: Level of awareness about parasitic preventive medicine

Level awareness	**Percentage**
Aware	49 (32.7%)
Moderately aware	81 (54%)
Not aware	20 (13.3%)

P value =0.000 which is more than α-value(0.05).

Table 19: Level of awareness about parasitic zoonosis

Level of awareness	**Percentage**
Aware	31 (20.7%)
Moderately aware	18 (12%)
Not aware	101 (67.3%)

P value =0.000 which is more than α-value(0.0

Table 20: Source of information about internal and external parasite control

Information	**Percentage**
Veterinarian	99 (75%)
Articles or newspaper	3 (2.3%)
Pet magazine	2 (1.5%)
Internet	15 (11.3%)
Friends and family	13 (9.8%)

Table 21: Pet's owner source of information about heartworm prevention

Information	**Percentage**
Veterinarian	56 (80%)
Articles or newspaper	1 (1.4%)
Internet	5 (7.1%)
Friends and family	8 (11.4%)

Table 22: Pet's owner source of information about parasitic zoonosis

Information	**Percentage**
Veterinarian	49 (62.8%)
Articles or newspaper	6 (7.7%)
Pet magazine	2 (2.6%)
Media mass	1 (1.3%)
Internet	14 (17.9%)
Friends and family	6 (7.7%)

9.3 Questionnaire form (English Version)

Research Title: Survey on Pet Owners Awareness about Parasitic Diseases in Cats and Dogs and the Preventive Measure in Klang Valley.

Client profile

1. Age :

2. Gender : □ Male □ Female

3. Education status : □ None □ Degree
□ Certificates □ Master
□ Diploma □ PHD

4. Employment status : □ Unemployed
□ Employed
□ Please specify profession:

5. Estimation of monthly income (RM) :
□ Low (<RM2000)
□ Middle (RM2000-RM5000)
□ High (>RM5000)

6. How long have you been keeping pets?
□ < 6months
□ 1year-5 years
□ more than 6 years

7. What is your reason for keeping pets?
□ For companionship
□ As hobby
□ Gift from someone
□ Saving stray cats/dogs

8. Where do you buy or get your pets?
□ Pet shop
□ Private veterinary clinic
□ Gift from someone
□ Saving stray cats/dogs

Pet's Profile

9. What species of pet do you keep at home?
□ Cats only
□ Dogs only
□ Cats and dogs
□ Others

10. How many cats do you have at home?
□ 0
□ Single cat
□ Multiple cats

11. How many dogs do you have at home?
□ 0
□ Single dog
□ Multiple dogs

12. Does your pets lives indoor or outdoor?
    - □ Indoors
    - □ Outdoors
    - □ Both

13. How old is your pets?
    - □ <6months (kitten/puppy)
    - □ 6 months-1 year (young adult)
    - □ 1 year-9 years (adult)
    - □ >9 years (geriatric)
    - □ Mixed

General Pet Health Care

14. Are all your pets are dewormed?
    - □ All are dewormed
    - □ Some are dewormed
    - □ None of them are dewormed

15. How often do you deworm your pet?
    - □ Never
    - □Once in 3 months
    - □ Once in 6 months
    - □ Once a year
    - □ Sometimes

16. Do you know at what age your pets can be dewormed?
    - □ Yes. Please specify:
    - □ No

17. Do your pets have ticks or fleas?
    - □ Yes
    - □ No

18. Do your pets in ticks and flea prevention?
    - □ Yes
    - □ No

19. How do you control or prevent ticks or fleas on your pets?
    - □ Manual removal
    - □ Ticks or flea repellent spray
    - □Spot on
    - □ Ticks or flea repellent shampoo
    - □ No attempt

20. How many times do you bath your pets?
    - □ Never
    - □ Once a month
    - □ Twice a month
    - □ Three times a month
    - □ Once a week

21. Are your pet/pets having other preventive treatment such as vaccination?
    - □ Yes
    - □ No

22. If yes, do you really follow the regime of vaccination?
    □ Yes
    □ No

23. Do you see your pet/pets scratching or biting its own body?
    □ Yes
    □ No

24. Do you ever bring your pets for heartworm test?
    □ Yes
    □ No

25. Are your pet/pets is on heartworm prevention?
    □ Yes
    □ No

General Knowledge about Preventive measure

26. Do you aware about deworming and ectoparasite prevention in pets?
    □ Yes
    □ No

27. If yes, how where do you get information about deworming and ectoparasite prevention for your pets?
    □ Veterinarian
    □ Articles or newspaper
    □ Pets magazine
    □ Media mass
    □ Internet
    □ Friends or family

28. Do you know about heartworm test and heartworm prevention?
    □ Yes
    □ No

29. If yes, where do you get information about heartworm prevention for your pets?
    □ Veterinarian
    □ Articles or newspaper
    □ Pets magazine
    □ Media mass
    □ Internet
    □ Friends or family

30. Do you think preventive medicine is beneficial to your pet health?
    □ Yes
    □ No

31. Tick (/) on your preferable statement below.

Statement	Disagree	Do not know	Agree
Parasites can cause life-threatening illnesses if left untreated.			
Ectoparasites such as tick, flea, lice, and mites can cause serious disease in your pets.			
Deworming can protect your pet and you against worms and other internal parasites.			
Mosquito can transmit disease such as heartworm and causing heart disease and respiratory problem.			
Intestinal worm will produce eggs that can be passed in the pet's stool.			
Intestinal parasites can cause diarrhoea, constipation, irritable bowel, cramps, gas, bloating, bleeding, itching, poor digestion, or malabsorption.			
We can reduce the risk of parasitic infection to your family by practicing good personal hygiene.			
Pet owner are recommended to bring their pet to veterinarian for annual testing of parasitic disease.			

General Knowledge about Parasitic Zoonosis

32. Do you know there are diseases that humans can get from dogs or cats (zoonosis)?
□ Yes
□ No

33. Do you understand what the meaning of zoonosis is?
□ Yes
□ No

34. If yes, where do you have the information about zoonosis?
□ Veterinarian
□ Articles or newspaper
□ Pets magazine
□ Media mass
□ Internet
□ Friends or family

35. Do you ever have zoonosis disease from your pets?
□ Yes
□ No
□ Don't know

36. Do you wash your hand after cleaning your pet's faeces?
□ Yes
□ No

37. Do you know your pet can transmit disease through bites, and scratches?
    □ Yes
    □ No

38. Which of the following diseases do you know? And did you, or your dog or cats ever have any of these diseases? Cross off the diseases you know about, you might have had, and/or your dog might have had.

Disease	**Know about**	**You have had**	**Dog/cat has had**
Hookworm (Ancylostoma canis)			
Roundworm (Toxocara canis)			
Tapeworm (Dipydium spp)			
Toxoplasmosis			
Ringworm (Dermatophytosis)			

9.4 BORANG SOAL SELIDIK (Versi Bahasa Malaysia)

Tajuk Penyelidikan : Kajian Mengenai Kesedaran Dalam Kalangan Pemilik Haiwan Mengenai Penyakit Parasit Kucing dan Anjing dan Langkah-Langkah Pencegahan di Kawasan Selangor.

Client profile

1. Umur :

2. Jantina : □ Lelaki □ Perempuan

3. Status pendidikan :
   - □ Tiada
   - □ Sijil
   - □ Diploma
   - □ Ijazah Sarjana Muda
   - □ Ijazah Sarjana
   - □ Sarjana Kedoktoran

4. Status pekerjaan :
   - □ Tidak bekerja
   - □ Bekerja
   - □ Sila isikan pekerjaan :

5. Anggaran pendapatan bulanan (RM):
   - □ Rendah (< RM2000
   - □ Tengah (RM2000 - RM5000)
   - □ Tinggi (> RM5000)

6. Berapa lama anda menjaga haiwan peliharaan?
   - □ < 6 bulan
   - □ 1 tahun -5 tahun
   - □ Lebih daripada 6 tahun

7. Kenapa anda menjaga haiwan peliharaan anda?
   - □ Sebagai peneman
   - □ Sebagai hobi
   - □ Hadiah dari seseorang
   - □Menyelamat kuncing/anjing terbiar

8. Di manakah anda membeli atau mendapatkan haiwan kesayangan anda?
   - □ Kedai haiwan peliharaan
   - □ Klinik veterinar Swasta
   - □ Hadiah dari seseorang
   - □ Menyelamat kuncing/anjing terbiar
   - □Tempat perlindungan haiwan

Profil Haiwan Kesayangan

9. Apakah spesies haiwan kesayangan anda?
   - □ Kucing sahaja
   - □ Anjing sahaja
   - □ Kucing dan anjing
   - □ Lain-lain

10. Berapa banyak kucing yang anda ada di rumah?
    - □ 0
    - □ Seekor kucing
    - □ Lebih daripada seekor kucing

11. Berapa banyak anjing yang anda ada di rumah?
    □ 0
    □ Seekor anjing
    □ Lebih daripada seekor anjing

12. Di mana haiwan kesayangan anda tinggal?
    □ Dalam rumah
    □ Luar rumah
    □ Di dalam dan luar rumah

13. Berapakah umur haiwan kesayangan anda?
    □ < 6 bulan (anak kucing / anjing)
    □ 6 bulan -1 tahun (muda)
    □ 1 tahun 9 tahun (dewasa)
    □ > 9 tahun (geriatrik)
    □ Campuran

Kesihatan Haiwan Kesayangan

14. Adakah haiwan kesayangan anda sudah diberi ubat cacing?
    □ Semuanya sudah diberi ubat cacing
    □ Sesetengah sudah diberi ubat cacing
    □ Semua belum pernah diberi ubat cacing

15. Berapa kerap haiwan kesayangan anda diberi ubat cacing?
    □ Tidak pernah
    □ Sekali dalam 3 bulan
    □ Sekali dalam 6 bulan
    □ Setahun sekali
    □ Kadang-kadang

16. Adakah anda tahu pada usia berapa haiwan kesayangan anda boleh diberi ubat cacing?
    □ Ya. Sila jelaskan:
    □ Tidak tahu

17. Adakah haiwan kesayangan anda mempunyai kutu atau kutu sengkenit?
    □ Ya
    □ Tidak
    □ Tidak tahu

18. Adakah haiwan kesayangan anda sudah mendapatkan rawatan pencegahan kutu?
    □ Ya
    □ Tidak

19. Bagaimana anda mengawal atau mencegah kutu atau kutu sengkenit pada haiwan kesayangan anda?

    □ Buang secara manual
    □ Penyembur anti kutu dan anti-kutu sengkenit
    □ Syampu anti kutu dan anti-flea
    □ Tidak melakukan apa-apa

20. Berapa kerap anda mandikan haiwan kesayangan anda?
    - □ Tidak pernah
    - □ Sebulan sekali
    - □ Dua kali sebulan
    - □ Tiga kali sebulan
    - □ Seminggu sekali
    - □ Kadang-kadang

21. Adakah haiwan kesayangan anda mempunyai rawatan pencegahan lain seperti vaksinasi?
    - □ Ya
    - □ Tidak

22. Jika ya, adakah anda benar-benar mengikuti jadual vaksin haiwan kesayangan anda?
    - □ Ya
    - □ Tidak

23. Adakah anda pernah melihat haiwan kesayangan anda menggaru atau menggigit badan sendiri?
    - □ Ya
    - □ Tidak

24. Adakah anda pernah membawa haiwan kesayangan anda untuk ujian cacing jantung?
    - □ Ya
    - □ Tidak

25. . Adakah haiwan kesayangan anda diberi rawatan pencegahan cacing jantung?
    - □ Ya
    - □ Tidak

Pengetahuan umum mengenai langkah pencegahan

26. Adakah anda sedar tentang ubat pencegahan seperti ubat cacing dan ektoparasit dalam haiwan peliharaan?
    - □ Ya
    - □ Tidak

27. Jika ya, di mana anda mengetahui maklumat tentang ubat cacing dan pencegahan ektoparasit?
    - □ Veterinar
    - □ Artikel atau akhbar
    - □ Majalah Haiwan
    - □ Media masa
    - □ Internet
    - □ Rakan-rakan atau keluarga

28. Adakah anda tahu tentang ujian cacing jantung dan ubat pencegahan cacing jantung?
    - □ Ya
    - □ Tidak

29. Jika ya, di mana anda mengetahui maklumat tentang ujian cacing jantung dan ubat pencegahan cacing jantung?
    - □ Veterinar
    - □ Artikel atau akhbar
    - □ Majalah Haiwan
    - □ Media masa
    - □ Internet
    - □ Rakan-rakan atau keluarga

30. Pada pendapat anda, adakah rawatan pencegahan akan memberi manfaat kepada kesihatan haiwan kesayangan anda?
    □ Ya
    □ Tidak

31. Tandakan (/) pada pernyataan yang anda setuju di bawah.

Kenyataan	Tidak setuju	Tidak pasti	Setuju
Parasit boleh menyebabkan penyakit yang mengancam nyawa jika tidak dirawat.			
Ektoparasit seperti kutu, sengkenit, dan hama boleh menyebabkan penyakit yang serius untuk haiwan kesayangan anda.			
Ubat cacing boleh melindungi haiwan peliharaan anda dan anda anda daripada cacing dan parasit dalaman yang lain.			
Nyamuk boleh membawa penyakit seperti cacing jantung dan menyebabkan masalah jantung dan pernafasan.			
Cacing usus akan menghasilkan telur yang boleh dilihat di dalam najis haiwan kesayangan anda.			
Parasit usus boleh menyebabkan cirit-birit, sembelit, kekejangan , kembung , pendarahan, gatal-gatal, dan masalah penghadaman .			
Kita boleh mengurangkan risiko jangkitan parasit kepada keluarga anda dengan mengamalkan kebersihan diri yang baik .			
Pemilik haiwan kesayangan disyorkan membawa haiwan kesayangan mereka ke klinik veterinar untuk ujian tahunan penyakit parasit.			

<u>Pengetahuan umum mengenai Zoonosis Parasit</u>

32. Adakah anda tentang penyakit manusia yang boleh datang daripada anjing atau kucing (zoonosis)?
□ Ya
□ Tidak

33. Adakah anda faham maksud zoonosis?
□ Ya
□ Tidak

34. Jika ya, di mana anda mengetahui maklumat tetang zoonosis?
□ Veterinar
□ Artikel atau akhbar
□ Majalah Haiwan
□ Media masa
□ Internet
□ Rakan-rakan atau keluarga

35. Adakah anda pernah menghadapipenyakit zoonosis dari haiwan kesayangan anda?

□ Ya
□ Tidak
□ Tidak tahu

36. Adakah anda mencuci tangan anda selepas membersihkan najis haiwan kesayangan anda?

□ Ya
□ Tidak

37. Adakah anda tahu bahawa haiwan kesayangan anda boleh mebawa penyakit melalui gigitan, dan cakaran?

□ Ya
□ Tidak

38. Yang manakah di antara penyakit-penyakit berikut yang anda tahu? Dan adakah anda, atau anjing atau kucing anda pernah mempunyai apa-apa penyakit tersebut? Tanda (X) pada penyakit yang anda tahu,dan penyakit anda mungkin hadapi atau haiwan kesayang anda mungkin hadapi.

Penyakit	**Tahu tentang**	**Anda pernah alami**	**Kucing/anjing anda pernah alami**
Cacing kerawit (*Ancylostoma canis*)			
Cacing gelang *(Toxocara canis)*			
Cacing pita *(Dipydium spp)*			
Toxoplasma			
Kurap (*Scabies scabei*)			