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DOG OWNERS' PERCEPTION TOWARDS CANINE HEART DISEASE: A BEHAVIOURAL STUDY

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DOG OWNERS' PERCEPTION TOWARDS CANINE HEART DISEASE: A BEHAVIOURAL STUDY

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A student project paper submitted to the
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CERTIFICATION

It is hereby certified that we have read this project paper entitled "Dog Owners Perception towards Canine Heart Disease: A Behavioural Study", by Yvonne Lim YiJun and in our opinion, it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course VPD 4999 – Final Year Project.

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DEDICATION

This project paper is specially dedicated to the Almighty God who is my strength and my guidance all this while, the one who made all this possible.

My family, my father, my stepmother, my brother, and furry youngest brother (my dog) with all love

To my late mother, who is always there in my heart, my inspiration

To my supervisors with all respect and gratitude

To all the dogs, which I ever encountered

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LIST OF ABBREVIATIONS

ACEi	Angiotensin-Converting Enzyme inhibitors
ACVIM	American College of Veterinary Internal Medicine
ANP	Atrial Natriuretic Peptide
ARVC	Arrhythmogenic Right Ventricular Cardiomyopathy
CDVD	Chronic Degenerative Valvular Disease
CKCS	Cavalier King Charles Spaniel
CHF	Congestive Heart Failure
CHD	Congenital Heart Disease
DCM	Dilated Cardiomyopathy
ECG	Electrocardiography
MVD	Mitral Valve Disease
PDA	Patent Ductus Arteriosus
UVH-UPM	Universiti Veterinary Hospital-Universiti Putra Malaysia

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ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999-Projek

PERSEPSI PEMILIK ANJING TERHADAP PENYAKIT JANTUNG ANJING: SATU KAJIAN TINGKAH LAKU

Oleh

YVONNE LIM YIJUN

Penyelia :Dr. Khor Kuan Hua

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Kunci utama yang mempengaruhi pemilik anjing untuk merawat anjing berpenyakit jantung adalah ditentukan oleh tahap kesedaran dan pengetahuan terhadap penyakit jantung anjing. Kajian ini bertujuan untuk menentukan tahap kesedaran dan pengetahuan dalam kalangan pemilik anjing; memeriksa peranan kesederhanaan di antara hubungan sikap, norma subjektif, tanggapan kawalan tingkah laku dan kebimbangan empati dengan niat pemilik anjing membawa

anjing untuk rawatan jika anjing didiagnos menghidapi penyakit jantung. Kajian tingkah laku ini dijalankan dengan bantuan soal selidik disampingi bantuan penemudugaan telah berjaya mengumpulkan data daripada 131 orang pemilik anjiing yang melawat ke Hospital Universiti Veterinar(UVH). Maklumat mengenai demografik, pemilikan anjing, tahap kesedaran terhadap penyakit jantung anjing dan niat merawati anjing telah dikumpulkan. Majoriti pemilik anjing (79.4%) sedar bahawa anjing akan menghidapi penyakit jantung tetapi 77.1% pemilik anjing menilaikan diri sendiri tidak memahami penyakit jantung anjing dan cuma 5.3% dalam kalangan mereka mempunyai tahap pemahaman dan pengetahuan yang tinggi. Halangan utama rawatan adalah berkaitan dengan kos (31.1%). Dalam kajian tingkah laku ini, kebimbangan empati dalam kalangan pemilik anjing terhadap anjing mereka memainkan peranan yang penting untuk mempengaruhi sikap dan niat merawati anjing berpenyakit jantung. Kajian ini menyimpulkan bahawa pemilik anjing perlu meningkatkan kesedaran dan pengetahuan terhadap penyakit jantung anjing melalui pendidikan.

Katakunci : penyakit jantung anjing, sikap, norma subjektif, tanggapan kawalan tingkah laku, kebimbangan empati, niat

ABSTRACT

Abstract of the project paper presented to the Faculty of Veterinary Medicine in partial requirement of the course VPD 4999 – Project

DOG OWNERS' PERCEPTION TOWARDS CANINE HEART DISEASE: A BEHAVIOURAL STUDY

By

YVONNE LIM YIJUN

Supervisor: Dr. Khor Kuan Hua
Co-supervisors: Dr. Khor Kuan Siew

The keys that may affect owners' decision on treatment of heart disease are their level of awareness and knowledge of canine heart disease. This study intends to determine the level of awareness and knowledge among dog owners; and examine the moderating role of relationship between attitude, subjective

norms, perceived behavioural control and empathic concern towards intention to treat if their dog was diagnosed with heart diseases. The behavioural study was conducted using interviewer-assisted questionnaire to collect data from 131 dog owners who visited to University Veterinary Hospital (UVH). Information on demographic, dog ownership, level of awareness of canine heart disease and intention to treat was collected. Majority of the dog owners (79.4%) were aware that dog can have heart disease but 77.1% rated that they do not understand about it and only 5.3% of them has good level of knowledge and understanding of canine heart disease. The main barrier of treatment was cost-related (31.1%). In this behavioural study, empathic concern of dog owners towards their dogs played a significant role in affecting their attitude and intention to treat their heart disease dog. The study concludes that owners' awareness and knowledge of canine heart disease should be improved via educational intervention.

Key words: canine heart disease, attitude, subjective norm, perceived behavioural control, empathic, intention

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Canine heart disease was rated as the fourth most common cause of death in dogs (Fleming *et al.,* 2011) and is estimated that 10% of dogs were prevalent to have heart disease (Atkins, 2009). It affects 1 out of 4 dogs over the age of 7 years old and the percentage of dog diagnosed with heart disease increases with age (Evans *et al.,* 2007). In Italy, about 25% of geriatric dogs diagnosed with heart disease between the age range of 9 to 12 years and the percentage increased to as high as 75% for dogs of 16-years of age or older (Guglielmini, 2003). However, the prevalence of canine heart disease in Malaysia is not well documented.

In general, canine heart disease can either be categorised into congenital or acquired (Cobb, 1994). The condition occurs with a decrease in the effective pumping of blood and eventually lead to accumulation of fluid in the chest and abdomen (Kumar *et al.,* 2013). The common symptoms seen in dogs with heart disease are exercise intolerance, breathing difficulties, coughing, loss of appetite and reduced body weight (Devi *et al.,* 2009).

Congenital heart diseases are often inherited. Hence, these diseases are usually diagnosed in young dogs whereas the acquired heart

disease are often diagnosed in middle age dog to geriatric, namely chronic degenerative valvular disease (which affects the heart valves) and myocardial disease (which affects the heart muscle) (Cobb, 1994). The common risk factors of heart disease include age, body condition and breed (Borgarelli, 2010). Overweight and aging are two main factors that contribute to canine heart disease (Borgorelli,2010; Thengchaisri *et al.,* 2014). Small breed dogs such as Miniature Poodles, Cocker Spaniels, Pomeranians and Schnauzers are prone to chronic degenerative valvular disease whereas large breed dogs such as Great Dane and Irish Wolfhounds are prone to myocardial disease (Fonfora, 2011).

Among all the canine acquired heart disease, canine heartworm disease in Malaysia was first reported by Retnasabapthy and Khoo (1976) with the prevalence of 25.8% and the latest study conducted in Johor Bahru reported a prevalence of 1.3% (Ng, 2012). The recent studies are rarely emphasising on prevalence but mainly reported on observation of specific heart disease in canine breeds and the effect of therapy which able to improve the quality of life as well as lengthen the survival period of dogs with canine heart disease.

Canine heart disease is one of the leading causes of death in dog. The disease should not be underestimated as it ultimately results in congestive heart failure in dogs when heart fails to pump enough blood to meet the body's needs and results in death. Clinical study results have

shown that there is no cure for congestive heart failure and the patients can live twice as long and have a quality life only if the dog is diagnosed and treated in early stage (Borgarelli *et al.,* 2010).

However, a February 2013 national survey held in Missouri, US stated that only half (49%) of dog owners have ever discussed their dog's heart condition with a veterinarian whereas more than half of them (55%) had never heard of congestive heart failure. In addition, Evans *et al*., (2007) reported that over 50% of dog owners were unaware that their dog may be at risk of heart failure. Meanwhile, another telephone survey held in US also revealed an alarming fact that 24% of dog owners assumed heartworms in dogs was similar to heart disease in dogs (Boehringer Ingelheim Vetmedica, Inc, 2013). In fact, heartworms are internal parasite and heart disease is a disease condition that impair the heart function and eventually leads to heart failure.

Unfortunately, this lack of awareness can mean that owners may fail to bring in their dogs for routine annual health screening or monitoring. Study have shown that the length and quality of a dog's life can be improved with early diagnosis of canine heart disease and appropriate long term treatment prescribed (Oyama, 2011). Hence, there is a need to raise the awareness among dog owners on the occurrences of canine heart disease as diagnosis at early stage of the disease allows early medical intervention to ensure a comfortable and quality of life for their

dog. Hence, with awareness and a good compliance between owner and their dogs are crucial to contribute greatly to canine heart disease treatment outcome.

1.2 OBJECTIVES

The objectives of this study were:

1. To access dog owners' awareness and knowledge of canine heart disease.
2. To determine the barriers to treat dog with heart disease.
3. To examine the relationship between attitude, subjective norms and perceived behavioural control towards intention to treat canine patient with heart disease.
4. To examine the moderating role of empathic concern towards intention to treat dog with heart disease.

1.3 HYPOTHESES

The null hypotheses (H_0) for this study were as follows:

1. Attitude is not positively related to intention to treat canine heart disease.
2. Perceived behavioural control is not positively related to intention to treat canine heart disease.
3. Subjective norm is not positively related to intention to treat canine heart disease.

4. Empathic concern not moderate the relationship between
    a) attitude
    b) perceived behavioural control
    c) subjective norm

    and intention to treat dogs with heart disease

The alternative hypotheses(H_1) for this study were as follows:

1. Attitude is positively related to intention to treat canine heart disease.
2. Perceived behavioural control is positively related to intention to treat canine heart disease.
3. Subjective norm is positively related to intention to treat canine heart disease.
4. Empathic concern moderates the relationship between
    a) attitude
    b) perceived behavioural control
    c) subjective norm

    and intention to treat dogs with heart disease

CHAPTER 2
LITERATURE REVIEW

2.1 Canine Heart Disease

Canine Heart Disease is commonly regard as silent killer and often, considered as an important health problem in dogs. Canine heart disease is a condition which disrupt the heart function of dogs and eventually cause inadequate cardiac output that lead to heart failure in severe and chronic situation (Gupta *et al*., 2007). Heart disease is different from heart failure as the former is an abnormality of cardiac structure but not necessary showing any clinical signs whereas the latter is when the heart is unable to supply blood to the body system effectively accompanied with clinical signs such as weakness and pulmonary congestion (Jelena, 2012). Owners with dogs diagnosed with chronic stage of the heart disease often view it as a complex and devastating disease (Parker, 2006).

2.1.1 Categories of Canine Heart Disease

Generally, canine heart disease is categorised into congenital and acquired. Congenital heart disease are defects that are presents when dog is born and become apparent when animal turns into adult. However, not all congenital defects are inherited and vice versa (Meurs, 2005). A retrospective analysis showed a high occurrence of congenital cardiac defects of 23.5% of the total cardiac disease (n=158) cases presented (Baumgartner & Glaus, 2003). In several major studies of congenital heart disease in dogs, the most common defects are

aortic stenosis, pulmonic stenosis and patent ductus arteriosus (PDA) (Tidholm, 1997; Meurs, 2005; Oliveira *et al.,* 2011; Yuan, 2014; Schrope, 2015). Many congenital heart diseases were found with significant inheritable component and the defect may be transmitted to the offspring (Belen *et al*., 2009). Therefore, it is often diagnosed in young dogs (< 1-year-old) and also young adult dogs (Strickland, 2008).

Acquired heart disease is cardiac disease which includes impaired heart valves or a weak heart muscle which eventually resulting in congestive heart failure (Ashley, 2009). The acquired heart disease develops and the clinical sign and pathology progresses over time. The most common types of acquired cardiac diseases in dogs are chronic degenerative valvular disease (CDVD), dilated cardiomyopathy (DCM), arrhythmogenic right ventricular cardiomyopathy (ARVC), and pericardial effusion (Fonfora, 2011). Small breed dogs are more prone to CDVD whereas the large breed dogs are predisposing to DCM. The most common acquired heart disease in middle to old age dogs is CDVD, particularly in Cavalier King Charles Spaniels, Pomeranians, Dachshunds and Miniature Poodles (Fonfora, 2011). In addition, cardiomyopathy and degenerative valvular disease of small breeds of dogs were found to have an important heritable component. (Randy, 2005). Cavalier King Charles Spaniels male dogs may develop CDVD in early age of life, however, this breed has a better prognosis compared to large breed dog with CDVD which usually progresses more rapidly (Haggstrom *et al*., 2008; Borgarelli & Haggstrom, 2010).

2.1.2 Prevalence of Canine Heart Disease

Approximately, 10% of all dogs was documented to diagnose with heart disease and the prevalence of heart disease can reach up to 60% as the dog ages (Rush, 2002; Atkin, 2010). In the study by Atkin (2009), the prevalence of chronic mitral valve disease in veterinary practice in North America accounts to 75% of canine heart disease among the dogs. Oliveira (2011) shown that the purebred dogs has a significantly higher probability of presenting with congenital heart disease when compared with Mongrel dogs. Most common acquired heart disease such as Myxomatous Mitral Valve Disease (MMVD) and Dilated Cardiomyopthy (DCM) were proved to have higher prevalence in certain breeds such as 90% for MMVD in older Cavalier King Charles Spaniels (Borgarelli & Haggstrom, 2010) and 33%-50% for DCM in Doberman Pinschers (O'Grady & O'Sullivan, 2002; Wess *et al.,* 2010).

2.2 Common Clinical Signs of Canine Heart Disease

Dogs diagnosed with canine heart disease often presented with a history of nocturnal coughing, exercise intolerance, dyspnoea, partial or complete anorexia, syncope, swelling in abdominal area, lethargy and at times, depression, cachexia and hepatojugular pulsation. The symptoms of heart diseases are almost entirely due to the inability of the heart muscle to maintain the normal circulation (Sarita *et al*., 2009). Even though coughing can occur in both cardiac disease and

respiratory disease, yet physical examination will provide an indication to differentiate both diseases (Fonfora, 2011). Jelena (2015) described that cardiac cough tends to be soft whereas honking and harsh with tracheal disease and productive cough can be observed with bronchial disease.

All cardiac diseases at some stage may present themselves as disorders of the heart rhythm, heart failure and death (Singh, 2002). Generally, heart failure manifests in signs of either congestion ("backward heart failure") or low cardiac output ("forward heart failure") (Oyama, 2010). In dog with congestive heart failure, the disease is progressive and death may occur within one year after developing clinical signs (Haggstrom *et al.,* 2008; Borgarelli and Haggstrom, 2010). However, according to author's knowledge, there is still no reliable study of mortality statistic caused by heart disease for adult canine in veterinary research field.

2.3 The Importance of Screening of Heart Disease

Early heart screening aim to identify cardiac abnormalities in dogs especially those used as breeders and early diagnosis would allow early medical intervention (Meurs *et al*., 2011). Generally, heart screening is advised as early as 12 months old in small breed dog and ideally, 18 months old in large breed dog. Screening program would only adequately exclude significant possibility of congenital heart disease (Northwest Surgeons, 2016). Diagnosing a heart disease

in dogs required a combination of information gathered from a thorough patient history and physical examination, electrocardiography (ECG), chest radiograph, echocardiography and blood profile (Veterinary Merck Manual, 2016). The clinical signs seen on the animals along with the physical examination often provide the key information regarding the severity, the urgency of care required, additional diagnostic tests to be performed, and prognosis (Veterinary Cardiologist Specialist, 2015).

Among various preliminary diagnostic procedures that were used, auscultation of the heart using a stethoscope during a routine physical examination proved to be the most useful method of detecting canine heart disease in an overtly healthy dog. This is because abnormal heart sounds such as gallop rhythms, murmurs and arrhythmias are characteristics of cardiac disease and could be recognized without much difficulty (Devi *et al*, 2009; Kumar *et al.,* 2013). Example, continuous murmur is often auscultated in dog diagnosed with PDA (Mike, 2006).

However, auscultation alone does not provide the diagnosis of the heart disease and further investigations are required ECG is indicated when irregular heart rhythm was noted as it records the heart's electrical activity from the body surface with the use of electrodes (Veterinary Merck Manual, 2016). ECG is useful to diagnose true arrhythmia in quiet and healthy dog, such as in Irish Wolfhounds presented with slightly irregular heart rate before showing any evidence of DCM (Vollmar, 2000). Nevertheless, it is very useful in

differentiating between DCM from pericardial effusion with certain pathologies such as right axis shifts in animals with pulmonic stenosis or left ventricular enlargement pattern in cases of severe aortic stenosis. However, such information provided are of limited use and therefore ECG should not be used as first line diagnostic tools (Mike, 2006).

Chest radiography is less costly, easily available and has the ability to identify pulmonary and vascular abnormalities. Chest radiograph is widely used to access overall heart size and shape as well as lung field changes. It helps to differentiate cardiac disease from respiratory disease by evaluating other abnormalities in lung such as pleural effusion and cancer (Jelena, 2004). It is advisable for thoracic radiograph to be taken when signs of congestive heart failure are present (Mike, 2006). Echocardiography examination provides the definitive diagnosis of the canine heart disease. This diagnostic tools; 1) can guesstimate the heart size; 2) the structure, motion and the valve function; 3) the heart contractility and; 4) assessment of the blood vessel and the flow. Therefore, echocardiography is more superior to radiographic examination and provides a greater accuracy (Côté *et al.,* 2015). Echocardiography works along with Doppler technology to investigate the direction and speed of blood flow at the same time allows evaluation of heart condition, diagnosis and assess severity of cardiac disease (Mike, 2006).

Haematology and serum biochemistry findings are not particularly useful to diagnose heart disease but it is helpful to investigate potential concurrent disease.

On the other hand, the cardiac biomarkers in the blood namely troponin-I and NT-proBNP have been reported to aid in diagnosis and monitoring of heart failure. Increased level of troponin-I concentrations was observed both, congenital and acquired heart disease in dogs (Langhorn & Willesen, 2015). On the other hand, NT- proBNP is a precursor to brain natriuretic peptide (BNP) which is released in response to atrial enlargement (Jelena, 2004). From the study of Bosswood (2003) reported that NT-proBNP level above 1750 fmol/ml indicates heart failure with 97.5% specificity and 84.0% sensitivity.

2.4 Treatment & Prevention of Congestive Heart Failure

Dog with cardiac disease is believed to have a reduced quality of life due to respiratory distress, poor appetite and reduced activity (Mallery, 1999). Hence, the overall aim of therapy is to improve the quality of life and increase the length of life of dogs (Veterinary Merck Manual, 2016). Heart disease eventually progress to CHF with a poor prognosis and average survival time of 6-12 months in dogs. Furthermore, there is no drug have proven its effectiveness in either preventing or slowing down progression of heart disease in dogs (PennVet,2013). The ultimate aim of therapy is mainly focused on minimise chronic stretch and injuries of the myocardial fibres, to reduce episodes of pulmonary oedema, improve cardiac output, regulate heart rate and rhythms and minimise thromboembolism, Types of medication used to treat canine heart disease

consists of diuretics, angiotensin converting enzyme, and dual-acting inodilators. Appropriate treatment for first-time heart failure should include diuretics (furosemide), dual-acting vasodilators and positive inotrope (pimobendan) and ACE inhibitor (ACEi) (Oyama, 2011). As a diuretic, furosemide is the drug of choice to control signs of CHF by eliminating excess fluid in the lungs, abdomen, reduce coughing and allow dogs to breathe properly (Fonfora, 2011). Evidence-based medicine study proved that there is beneficial effect by adding ACEi, pimobendan and spironolactone to the treatment of furosemide (Atkins, 2009; Bernay *et al*., 2010).

Angiotensin-converting enzyme inhibitors (ACEi) acts on renin–angiotensin-aldosterone system by inhibiting angiotensin I to angiotensin II which may result in vasoconstriction and increase in blood volume. Meanwhile, ACEi acts by vasodilate both arteries and veins, reduce vascular resistance and ease the pumping of the heart. The ACEi is not recommended to be used before the onset of CHF as it makes no difference in the onset of CHF and survival time (Kvart *et al.,* 2002; Atkins *et al.,* 2007). Furthermore, the ACE inhibitor alone was found unlikely to substantially improve cardiac failure in acute stage and therefore ACEi is recommended to be used together with diuretics (Oyama, 2011).

On the other hand, pimobendan which is a type of inodilator, calcium-sensitizing agent and also phosphodiesterase inhibitor. Pimobendan is able to improve quality of life and survival of dogs with CHF (Haggstrom *et al.*, 2008). A study conducted in Dobermans dogs revealed that the administration of pimobendan

significantly prolonged the median time to the onset of CHF until death in dogs diagnosed with preclinical DCM. The usage of pimobendan also resulted in prolongation of the time to death attributable to all causes in dogs (Summerfield, 2012).

In addition, another weaker diuretic, spironolactone, was found to improve the longevity and clinical outcome in dogs with heart failure due to mitral valve disease (MVD) (Bernay *et al.,* 2010). Some anti-arrhythmic medications were prescribed in dogs diagnosed with DCM because of increased incidence of ventricular arrhythmias that can be fatal and lead to sudden death. In dogs with heart failure, quality of life can be improved with prompt and long term continuous use of pimobendan, diuretics, and an ACE inhibitor (Oyama, 2011). Furthermore, the ACVIM Consensus statement (2009) recommend the combination of drug therapy for management of CHF include the use of furosemide, thiazides, spironolactone and ACE inhibitors.

The best preventive method for canine heart disease is provide dogs with a heart-healthy nutrition. Dog should be offered well balanced diet to help maintain an ideal body weight and prevent obesity as both may predispose the dogs to heart disease. Dog with severe chronic heart disease are prone to signs of protein energy malnutrition (cachexia) and a high quality protein diet is required to prevent this condition (Randy, 2005).

2.5 Dog Owner Awareness of Canine Heart Disease

Sarita *et al*, 2009 reported that recognition of canine cardiac diseases is not emphasis and often ignored on account of lack of awareness and knowledge by the dog owner. Davis *et al.,* (2010) reported that the only thing that would alarm the dog owners to bring their pet to seek for veterinary treatment was due to awareness of zoonotic disease and because their health was threaten. Besides that, Oyama (2008) reported that dog owners often seek the veterinarian advise when their pet was found in moribund state. Otherwise, the owners would rather feed human medication to their pets without first seeking advises and consultant from the vets. Hence, we can assume that poor client awareness and compliance are well recognized problems in veterinary medicine (Jevring, 2005).

A telephone survey by Lam (2014) reported that majority of the dog owners have some perception of canine disease and knew that dog could get heart disease prior to diagnosis of their dogs with the specific heart conditions. To author's knowledge, these dog owners very much relies on veterinarian to provide information of canine heart diseases to them. This observation is similar to a study by Davies *et al.,* (2009) which claimed that over 90% pet owners emphasized that the veterinarians are the important person that provide sound advice to them. Also, owners rely upon veterinarian to provide best protection to their pets, including preventive deworming (Carithers, 2002).

Study conducted by Oyama *et al.,* (2008) reported that successful treatment of heart disease in dogs very much depends on owners' perceptions and priorities with regard to issues of quality of life. Hence, dog owners' level of awareness can be increased by practicing preventive care that allows owner to be more active in taking care of their dogs and enhance good owner compliance which is crucial to improve survival rate of canine heart patients (Pet Wellness Report, 2013).

2.6 Challenges of Consumer Health Information for Dog owners

Dog owners or also known as veterinary consumers who are responsible in the care of their dogs often needs correct information to make correct health care decision. Unfortunately, unlike consumer human health care, veterinary consumer health information remains unexplored (Murphy, 2006). Sometimes, dog owners who received a diagnosis regarding about their pets from the veterinary clinician hadn't understood of all the details which they wanted to know regarding about the disease (Brevitz, 2006).

Poor communication between pet owners and clinicians would often resort pet owners to earnestly seek for health information which are limited in numbers and the depth of resources addressing specific diseases and disorders written were not at an appropriate reading level for pet owners to understand. It was commented that more than 50% of entries for Congestive Heart Failure (CHF) in text were written above average public reading level (Baker &Wilson, 1996).

There is a lack of resources that comprehensively cover for specific disease and disorders namely congestive heart failure or canine heart disease which become a barrier for dog owner to obtain health information for their dogs. Only 46 out of 185 examined print resources contain information of CHF.

Similarly, most of the websites on the 'Recommended Resources for the Veterinary Consumer' often with high readability level and this causes difficulties for dog owners to understand the information obtained (Murphy,

2006). Factors such as higher frequency used of technical language, the reader's interest and appropriateness of the text for the intended audience greatly affect the owner's ability to understand about their pet's condition (Baker &Wilson, 1996; Eysenbach *et al.,* 2002).

Other challenges to veterinary consumer to obtain the consumer health information of their pet is the confusion of mixed information of both the veterinary medicine and human medicine. The problems occurred when dog owners tend to look for health information of their pet from human medicine website such as MedlinePlus. Even though MedlinePlus did offer pets' health information in their website, however health information of pets often being delivered from human medicines perspective which not exactly correct. Hence, this problem often caused confusion among pet owners (Intelligent Content, 2005). This problem become worse when veterinary did not play a role in guiding pet owners to access reliable source of information regarding the pet health in the internet.

In fact, Kogan (2014) reported that there were less number of veterinary clinics involved in guiding dog owner to accurate and reliable pet health information from the internet. This phenomenon probably can be supported by another study by Bayer in year 2011 reported that 15% of pet owners were found relying less on veterinarians with the use of internet. In addition, a study by Hofmeister *et al.,* (2008) found veterinary clients ranked the Internet as the third most commonly consulted source of information about pet health, behind general practitioners

and veterinary specialists. Hence, this situation slowly replaces the proactive role of veterinarians to share appropriate pet health information to dog owners.

CHAPTER 3
MATERIALS AND METHODS

3.1 Sample and Procedures

The behavioural study was carried on a target respondent whom are dog owners either having dog(s) now or have had one before. Consent from identified respondents (dog owners) who visited the University Veterinary Hospital (UVH) was obtained prior to recruitment for this study. The aim is to test the conceptual model and the associated hypotheses. One hundred and thirty-one respondents were approached and given a standardized interviewer-assisted questionnaire as they are waiting to be called into the consultation room. They were assured and informed that their responses will be kept confidential and used for research purposes only.

The questionnaire was constructed to allow data collection of information inclusive of demographic, dog owner information, owner awareness of canine heart disease, their intention to treat their dog, the source of support to treat their dog, their perceived behavioural control, their attitude and empathic concern. Each interview with the respondents lasted approximately 15 minutes and was conducted in English and Malay language. Interviewer assisted in explaining and translating the terms or sentences that the respondents did not comprehend. In order to eliminate any potential bias, no specific selection was made in choosing

respondents whose dogs had heart disease and interviewer was not allowed to provide his own opinion to the respondent.

3.2 Measures

Theory of Planned Behaviour (TPB) model and most of the variables derived from were adapted as measures for this study. TPB is a theory to predict an individual's intention to engage in a behaviour at a specific time and place. It assumed that individual behaviour is driven by behaviour intentions, where behaviour intentions are a function of three determinants: an individual's attitude toward behaviour, subjective norms (SN), and perceived behavioural control (PBC) (Ajzen,1991). Attitudes, SNs and PBC are assumed to be predicted from an individual' beliefs about the behaviour (Walker, *et al.*, 2004). Meanwhile, multiple choice questions were used on demographic, dog ownership information and awareness of canine heart disease of respondent whereas 7-point Likert scales which consist of strongly disagree to strongly agree was used test the owners' intention to treat, the perceived behavioural control, the subjective norms, the attitude of owner and their empathic concern. Nevertheless, 10-point Likert scales which consist of poor understanding to very good understanding also used to query respondent understanding towards canine heart disease.

3.3 Data Analysis

The data collected in this study were analysed for percentage proportions using Microsoft Excel®. Meanwhile, IBM Statistical Package for the Social Sciences(SPSS) software version 22 was used to obtain the demographic profile of respondent for descriptive statistics, multivariate normality test and factor analysis (linear regression and hierarchical analysis) whereas the research hypotheses were tested using variance-based structural equation modelling to test instrument reliability and measure the measurement and structural model. According to Hair *et al.,* (2014), measurement model (validity and reliability of the measures) as well as the examination of the structural model (testing the hypothesized relationship) were tested following the recommended two-stage analytical procedure. On the other hand, loading a bootstrapping method with 500 resamples was used to test the significance of the path coefficients and the loading (Hair *et al.,*2014).

CHAPTER 4
RESULTS

4.1 Demographic Profile of Sampled Respondent

The demographic profile of the respondents was tabulated and presented as shown in Table 1. In total, 134 respondents (dog owners) participated in this study but 3 dog owners were excluded from the study due to incomplete questionnaire returned. Out of the 131 respondents, they were comprised of 58.8% female and 41.2% male, respectively. Majority of the respondents were between the age of above 40 years old (48%) followed by, 27.5% aged between 30-39 years old, 21.4% aged between 20-29 years old, and 3.1% below 20 years old.

Majority of the respondents had an income level of between RM 2001-RM 5000, which was 33.6%. This then followed by an income level of less than RM 2000 at 20.6%, between RM 5001-RM 10000 at 19.8%, between RM 10001-RM 20000at 16% and lastly income level of more than RM 20000 at 9.9%. The respondents were mostly employed (45.8%), followed by self-employed (29.0%), retired (11.5%), whereas student and unemployed were both comprise of 6.1% and only minority of them were housewife which was 1.5%.

Variables	Measure	Frequency *n*=131	Percentage (%)
Gender	**Male**	54	41.2
	Female	77	58.8
Age	**Below 20 years**	4	3.1
	20-29 years	28	21.4
	30-39 years	36	27.5
	above 40 years	63	48.1
Income	**less than RM2000**	27	20.6
	RM2001-RM5000	44	33.6
	RM5001-RM10000	26	19.8
	RM10001-RM20000	21	16.0
	More than RM20000	13	9.9
Employment status	**Unemployed**	8	6.1
	Self-employed	38	29.0
	Employed	60	45.8
	Retired	15	11.5
	Student	8	6.1
	Housewife	2	1.5

Table 1: Percentage Distribution of Demographic Profile of Dog Owners

4.2 Dog Ownership Information

4.2.1) Percentage Distribution of Dog Owners' Years of Experience of Having Dogs

Out of 131 respondents, about 58.8 % (*n*=77) of the dog owners had10 years of experience having dogs as pets, followed by 28.2% (*n*= 37) of the owners in the group of 11 to 20 years of experience, about 6.1% (*n*=8) of the owners in the group of 21 to 30 years and owners with 31 to 40 years and 41 to 50 years of experience of having dogs were both consist of 3.1% (*n*=4) respectively. Owners with 51 years and above years of experience constituted the least proportion, at 0.80% (*n*=1).

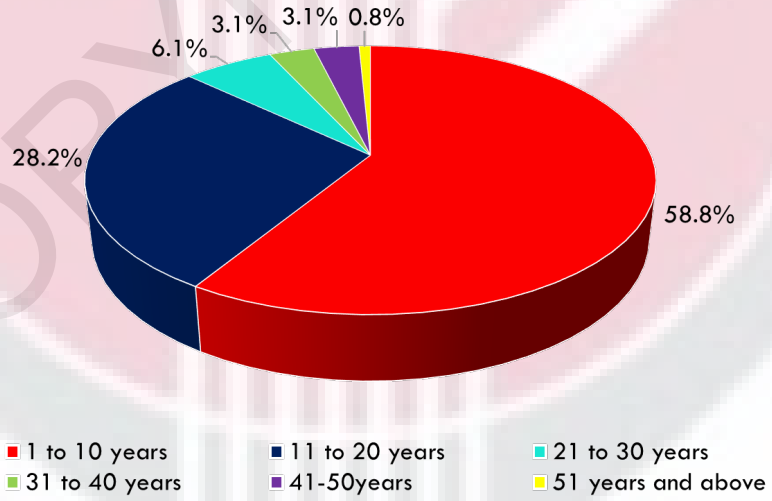

Figure 1: Percentage distribution of dog owners' years of experience of having dogs

4.2.2) Percentage Distribution of Dog Owners' Purpose of Having Dogs

Most of the owners kept the dogs as a pets (28.0%; *n*=76) and companion (24.7%;*n*=23). Others had dogs as a helper or guide for disability (15.1%;*n*=41), guard dog (14.4%;*n*=39), as a pet for their children (8.5%;*n*=23), and some of them rescue stray dogs from the street (8.1%;*n*=22). Approximately 0.7% (*n*=2) of owners have other reasons such as they were helping friends to take care of dogs and some worked as dog caretakers. Minority of the owners (0.4%; *n*=1) were keeping dogs for breeding purpose.

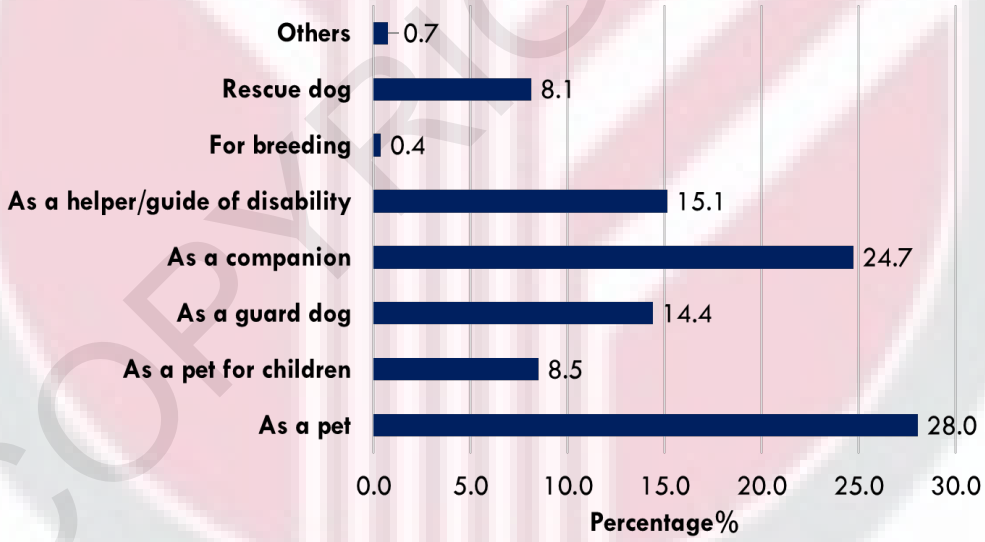

Figure 2: Percentage distribution of dog owners' purpose of having dogs in their household

4.2.3) Percentage Distribution on Dog Owners' Opinion on Lifespan of Dogs

As shown in Figure 3, approximately 58.8% (*n*=77) of the owner assumed that dogs can live between 10-15 years whereas 24.4% (*n*=32) of them thought that the lifespan of dogs can last more than 15 years. Owners assumed that dogs can live for 5 to 10 years comprised of 16% (*n*=21) and 0.8% (*n*=1) of them assumed that dogs can live for 2 to 5 years.

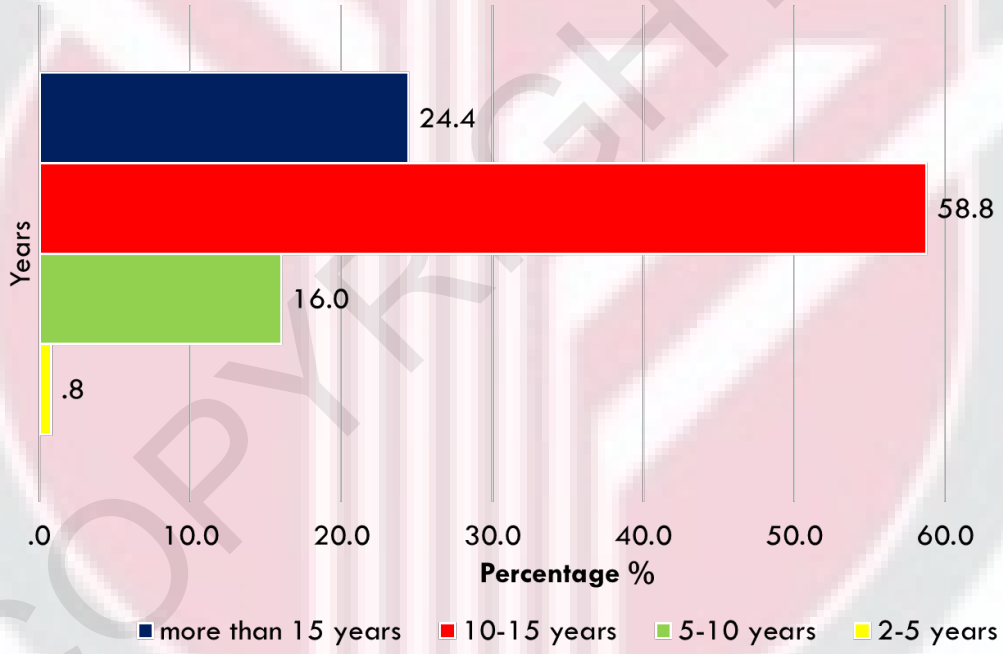

Figure 3: Percentage distribution on the opinion on lifespan of dogs among the dog owners who visited to UVH

4.2.4) Percentage Distribution On the Level of Awareness of Canine Heart Disease Among the Dog Owners

Approximately 79.4% (*n*=104) of dog owners were aware of canine heart disease (Figure 4). However, about 13.0% (*n*=17) were not aware of canine heart disease and only 7.6% (*n*=10) of them were unsure about canine heart disease

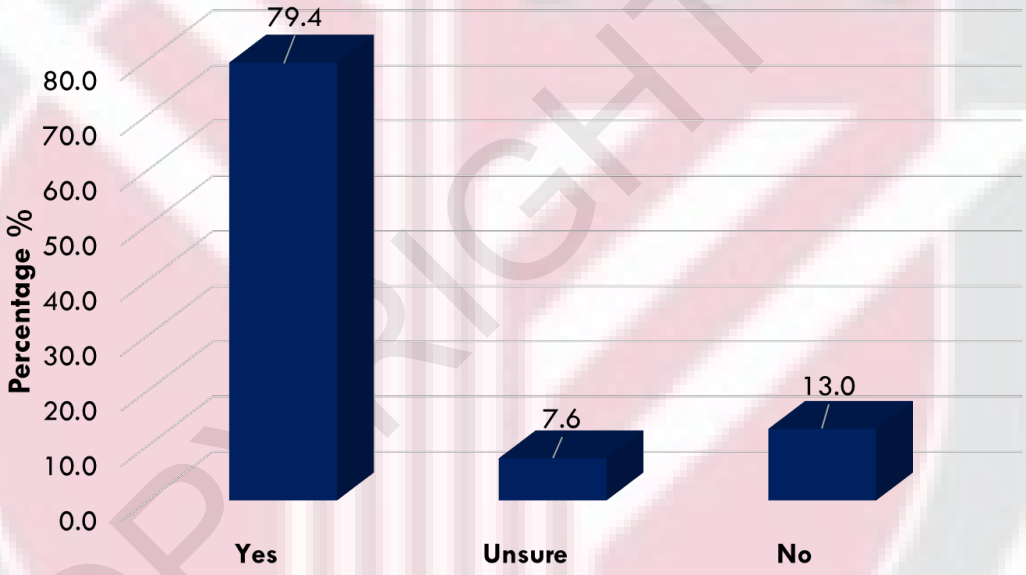

Figure 4: Percentage distribution on the level of awareness of canine heart disease among the dog owners who visited to UVH

4.2.5) Source of Information of Canine Heart Disease Obtained by Dog Owners

Fourty-five of the dog owners (24.1%) revealed that they learned about canine heart disease from their veterinary. Other source of information was obtained from the internet (21.9%; *n*=41), reading either the pet books, magazines or newspapers (16%; *n*=30), relatives or friends (13.4%; *n*=25) and, from previous experience of having a dog diagnosed with heart disease (11.8%; *n*=22). Only very few dog owners obtained information of canine heart disease from poster (5.3%; *n*=10) and from pet show or pet expo (3.2%; *n*=6). The percentage of dog owners who claimed that they were unaware of canine heart disease consisted of 2.7% (*n*=5). Minority of the dog owners (1.6%; *n*=3) got to know about canine heart disease from pamphlet.

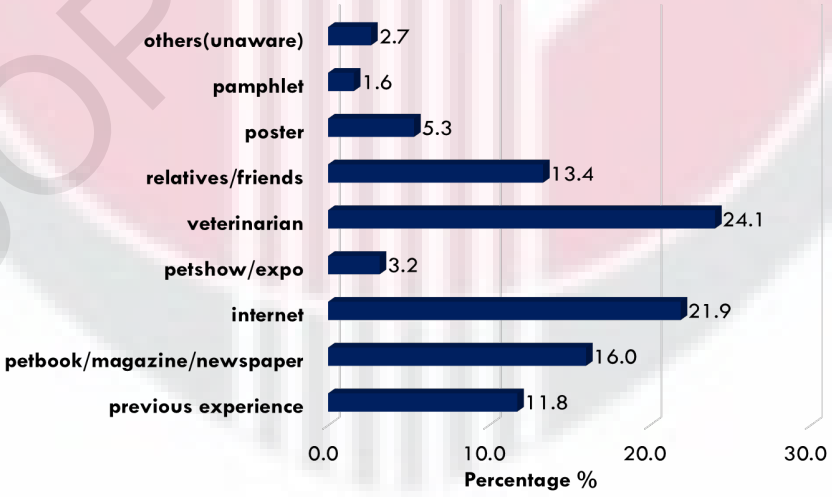

Figure 5: Percentage distribution of owners' source of information on canine heart disease

4.2.6) Percentage Distribution on Scale of Understanding of Canine Heart Disease Among the Dog Owners

Approximately 77.1% (*n*=101) of the dog owners graded themselves within the scale of 1 to 5 (do not understand) whereas 22.9% (*n*=30) of the owners graded themselves within the scale of 6 to 10 (understand) on their level of understand canine heart disease.

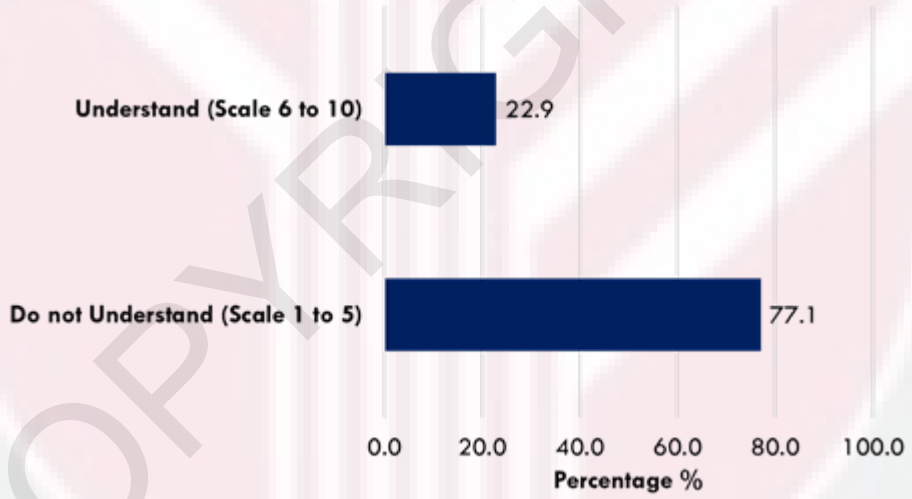

Figure 6: Percentage distribution on scale of understanding of canine heart disease among the dog owners

4.2.7) Percentage Distribution Among Dog Owners' Ability to Identify Clinical Signs of Heart Disease in Dogs

Sixty-five (49.6%) dog owners were having poor ability and 45% (*n*=59) of them had fair ability to detect clinical signs of heart disease in their dogs. Only 5.3% (*n*=7) of the dog owners were good in identify clinical signs of heart disease based on their knowledge or experience that they had.

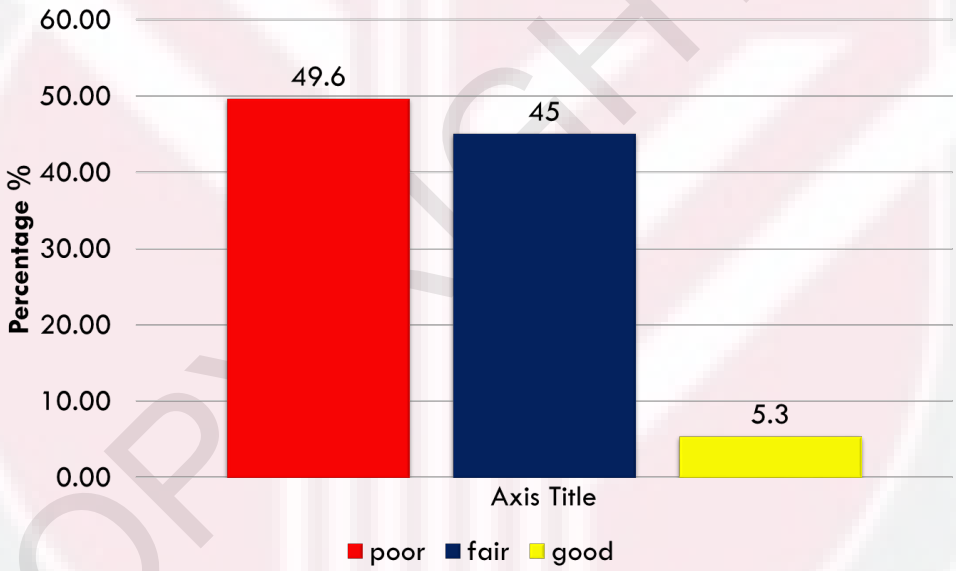

Figure 7: Percentage distribution among dog owners' ability to identify clinical signs of heart disease in dogs

4.2.8) Percentage Distribution on Dog Owners' Willingness to Treat Their Dogs If Diagnosed with Canine Heart Disease

Approximately 88.5% (*n*=116) dog owners agreed to treat their dogs if their dogs diagnosed with heart disease. Owners who were unwilling to treat their dogs with heart disease comprised of 2.3% (*n=3*) and 9.2% (*n*=12) of them were uncertain if they would treat their dogs if diagnosed with heart disease.

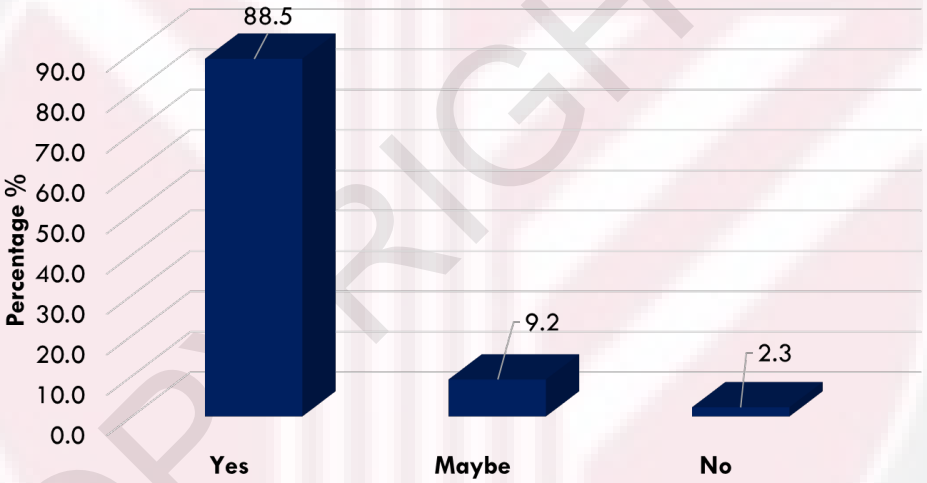

Figure 8: Percentage distribution on dog owners' willingness to treat their dogs if diagnosed with canine heart disease

4.2.9) Percentage Distribution of Dog Owners on the Barriers of Treatment of Canine Heart Disease

Cost-related issue is the most common barrier (32.1%; *n*=53) among dog owners for treatment of canine heart disease. However, about 25.5% (*n*=42) of the dog owners declared that there was no reason to hinder them from treating their dogs. Owners who claimed that time-related issue and no cure or the particular heart disease both comprised of 24.2% (*n*=40) and 15.8% (*n*=26), respectively. The remaining 2.4 % *(n*=4) of dog owners gave other reasons such as distance to animal clinic, transportation issues and stressful for the dogs as the barriers to treat their dogs with heart disease.

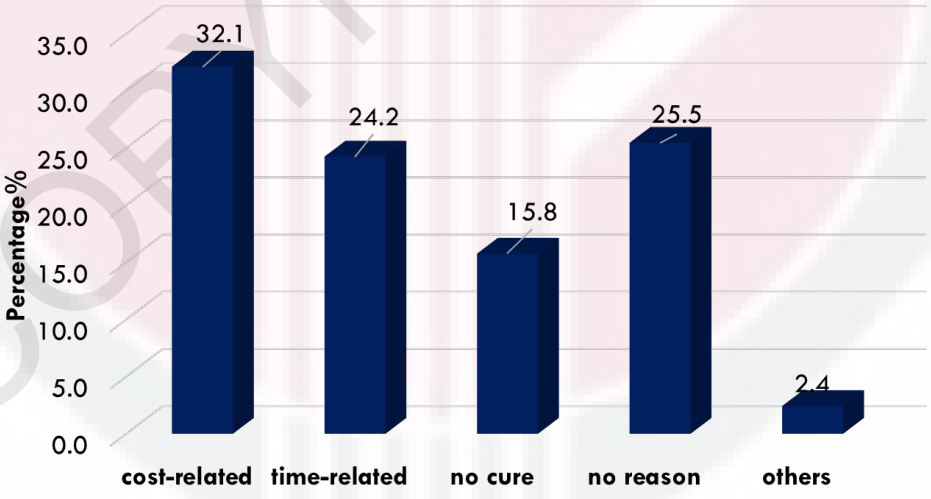

Figure 9: Percentage distribution of dog owners on the barriers of treatment of canine heart disease

4.2.10) Dog Owners' Perception of Troublesome of Treatment of Canine Heart Disease

Most of the dog owners (45.0%; n=59) did not felt that treatment was a troublesome to them if their dog was diagnosed with heart disease. On the other hand, owners who agreed that treatment caused them troublesome were comprised of 29.8% *(n*=39*)*. Subsequently, only 25.2% (*n*=33) of them were uncertain about the troublesome of treatment if their dog was diagnosed with heart disease.

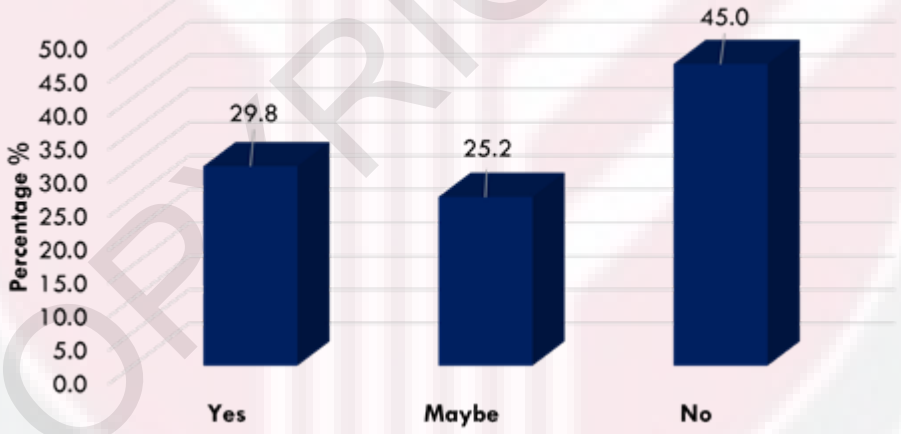

Figure 10: Dog owners' perception of troublesome of treatment of canine heart disease

4.3 Measurement Model

Latent Variable	Items	Loading	Average Variance Extracted (AVE)	Composite Reliability(CR)
Attitude	ATT1	0.631	0.483	0.823
	ATT2	0.728		
	ATT3	0.690		
	ATT4	0.670		
	ATT5	0.749		
Empathy	EMP1	0.740	0.576	0.802
	EMP2	0.844		
	EMP3	0.684		
Intention	Intention 1	0.721	0.563	0.794
	Intention4	0.825		
	Intention5	0.700		
PBC	PBC 1	0.530	0.509	0.801
	PBC 2	0.797		
	PBC 3	0.853		
	PBC 4	0.627		
SN	SN 2	0.898	0.537	0.770
	SN 4	0.547		

Table 2: Convergent Validity of Constructs

There were two way of evaluation for assessment of the measurement model namely, the reliability and the validity evaluation. The reliability was tested by measuring the consistency of the measurement items across time and free from bias. In this study, reliability was tested using the Composite Reliability (CR). The CR value is to be interpreted like Cronbach's alpha where the instrument is considered as reliable when the value is above 0.7 (Fornell and Larcker, 1981).

The validity test was done to measure the accuracy and consistency of the measurement items. In this study, validity evaluation comprises of convergence and discriminant validity analysis. Two key coefficient which is the Composite Reliability (CR) and Average Variance Extracted (AVE) were used to assess the convergent validity (Chin, 2010; Hair *et al.*, 2011). Generally, the loading of each item must be higher than 0.7 to accept the validity of the items (Hair *et al.,* 2011). The items should be removed if the loading is lower than 0.4. However, the loading between 0.4-0.7 should be removed only if the removal gives a better result of CR and AVE.

In this study, most the loading for all the items exceeded the recommended value of 0.7 (Table 2). However, there are a few indicators that had loadings of between 0.4-0.7 were required to be removed based on the AVE and CR. The AVEs value of the latent variable must be more than 0.5 for accepting their convergent validity (Chin, 2010; Hair *et al*., 2011). Most of the AVE (Table 2) exceeded the recommended value of 0.5 except the attitude variable which has a value of 0.483. Data collected for attitude was not required to be removed

because both AVE and CR threshold were being met. On the other hand, the CR value for each variable has a minimum of 0.770 which indicates that the measurement model is acceptably reliable.

Latent Variables	Attitude	Empathy	Intention to treat	Perceived behavioural control	Subjective norm
Attitude	**0.695**				
Empathy	0.347	**0.759**			
Intention to treat	0.528	0.250	**0.751**		
Perceived behavioural control	0.440	0.439	0.515	**0.714**	
Subjective norm	0.012	0.121	-0.025	0.045	**0.733**

Note: Diagonals (**bold face**) represent the square root of the average variance extracted while the other entries represent the correlations

Table 3: Discriminant Validity of Constructs

Furthermore, we tested the discriminant validity by comparing the correlations between construct and square root of the AVE extracted from the construct (as shown in Table 3). The discriminant validity is adequate if the square root of the AVE is greater than the correlation with other construct (Hair *et al.,* 2010). Therefore, the measurement models for this study were adequate convergent and discriminant validity.

4.4 Structural Model

Hypothesis	Relation	Standard Error	T-statistics	P-value	Findings
H1	ATT->INT	0.106	3.067	0.002	Supported
H2	PBC->INT	0.098	3.344	0.001	Supported
H3	SN->INT	0.087	0.446	0.656	Not supported
H4a	ATT*EMP->INT	0.127	1.943	0.052	Supported
H4b	PBC*EMP->INT	0.106	0.022	0.982	Not supported
H4c	SN*EMP->INT	0.147	0.402	0.688	Not supported

Table 4: Path Coefficients and Hypothesis Testing

The hypothesis was developed by associating with a causal link in the structured model, which symbolized the relationship among the latent variables. Two-tailed T test was used with 1 percent and 5 percent significance for all statistical tests. Table 4 illustrates the relationship between the intention of treatment, attitude, empathic concern, perceived behavioural control and subjective norm. The path coefficients summarise the strength of the hypothesised relationships among the latent variables. Based on the hypothesis of this study, the result revealed that the hypothesis finding was supported with the T-value of more than 1.645. Hence, H1 and H2 fulfilled the criteria and the relationship between attitude and intention (t=3.067, p<0.01) and the relationship between perceived behavioural

control and intention (t=3.344, p<0.01) were supported. The same thing applied to H4a, empathic moderated the relationship between attitude and intention of treatment (t=1.943, p<0.05). However, the results of H3 (t=0.446, p<0.1), H4b (t=0.022, p<0.1) and H4c (t=0.402, p<0.1) failed to fulfil the criteria and the relationship were not supported.

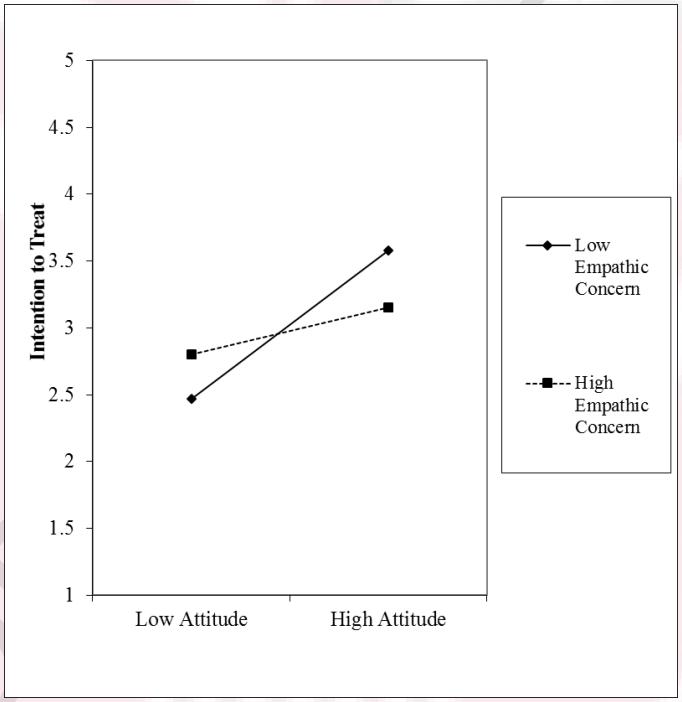

Figure 11: Post-Hoc graph to demonstrate the empathic concerns moderates the relationship between attitude and intention to treat dog with canine heart disease

Post-hoc graph was constructed in order to see the moderating effect of empathic concerns on the relationship of attitude and intention to treat. From the graph, the solid line represents the group of dog owners with low empathic concerns whereas the dotted line represents dog owners with high empathic concerns. The steeper the line indicates the larger the slope of the line, the stronger the

relationship between the attitude of the dog owner and their intention to treat. Hence, among the low empathic concern group of dog owners, the lower the attitude they have, the lower their intention to treat their dog and vice versa. However, for dog owners with high empathic concern, their attitudes would not affect much on their intention to treat their dogs. In other words, their attitude was unable to determine their intention to treat their dog with heart disease. In this study, veterinarian intervention to educate dog owners with low empathic concern is essential in order to change their attitude and increase their intention to treat their dog with heart disease.

4.5 Coefficient of Determination (R^2)

Meanwhile, the R square (R^2) values is a statistical measure of how close the data lies to the fitted regression line which was used as predictive power of the model for this research. The goodness measure of the structural model was tested using (R^2). Generally, the higher the R-squared, the better the model fits the data. The result from this study shows that the R^2 value is 0.434 for the intention of treatment which indicates that 43% of the variance of the intention of treatment can be explained by the modelled variables. In other words, the attitude, perceived behavioural control and subjective norm were able to predict 43.1% of variance of intention to treat dog with heart disease among the dog owners.

CHAPTER 5

DISCUSSION

This study revealed that 76% of the dog owners (*n*=104/131) were aware of canine heart disease. This finding was similar with the study by Lam *et al.* (2014) which reported that 71% (*n*=46/65) of the dog owners were aware of the disease. In this group of dog owners, the awareness of canine heart disease was obtained from two source of information namely their veterinarian and the internet, 24.1% and 21.9% respectively. Often, they associated that dogs would have heart disease just like humans.

However, majority of the dog owners (55.7%; *n*=73/131) who were aware that dogs can have heart disease did not understand of the disease when asked further. Most of them choose the scale of between 1 to 5 indicating that they have low level of understanding about heart disease in dogs.

According to previous study, only 18% (*n*=12/65) of the dog owners failed to identify the clinical signs of heart disease in their dogs that were diagnosed with heart disease (unpublished, Lam *et al.,* 2014). In this study, 49.6% (*n*=65/131) of the dog owners scored poorly on the ability to identify clinical signs of dogs suffering from heart disease. Pet Wellness Report (2013) commented that many owners often failed in recognizing morbidities in their pets as the chronic disease is increasing among the pet yet the visitation to

veterinarian is decreasing (Pet Wellness Report,2013). From this survey, most of the dog owners had cared or are caring a dog patient suffering from heart disease. In general, dog owners with poor awareness and knowledge of canine heart disease were found to be those who often caused a delay of diagnosis and treatment of canine heart disease (Sarita *et al.,* 2009).

According to a national survey held in US in year 2013, nearly a quarter of dog owners having a misconception which assumed that heartworm and heart disease in dogs were similar (Boehringer Ingelheim Vetmedica, Inc.,2013). This misconception was due to lack of awareness and knowledge among the dog owners mainly because of limited resources that addressing canine heart disease (Baker & Wilson, 1996), limited in depth resources regarding canine heart disease which were written in average reading level (Murphy, 2006), confusion of mixed information of veterinary medicine and human medicine (Pet and Pet Health, 2004) and poor involvement of veterinarian in guiding owners to access the reliable and accurate source of pet health information from the internet (Kogan,2014).

Pfukenyi *et al.* (2010) considered veterinarian as the best source to provide pet owners with advice by virtue of their training and their close relationship with owners. However, Volk *et al.* (2011) reported that the growth in the use of internet by pet owners would create confusion or poor understand of canine heart disease. What is more alarming when the study has shown that 39% (n=853/2188) of the pet owners tend to seek on internet first when their pets are

sick followed by 15% (*n*=328/2188) of the pet owners admitted that they rely less on veterinarian after using the internet. At time, most of the information from the internet tend to misled or confuse the readers when the materials are difficult to understand. Veterinarian should be more active in directing dog owners towards valid, accurate and reliable online information (Kogan, 2014).

According to Jevring (2005), poor client awareness and compliance were a well-recognised problems in veterinary medicine. A high percentage of dog owners (86%; *n*=1882/2188) thought that routine check-up is unnecessary and was speculated probably due to lack of awareness and perception of pet health knowledge and other factors such as high veterinary cost, unwilling to put stress on their pets and caused troublesome to themselves may played a role in poor compliance with treatment among dog owners (Voir *et al.,*2011).

From previous study on owner compliance of canine heart treatment, approximately 67% (*n*=43) claimed that they were compliant with the treatment course as that they had never skipped the daily drug administration for their dogs but majority of this group of owners motivated to ensure that their heart disease dogs does not feel unwell (unpublished, Lam *et al.,*2014). The results shown in this study revealed that nearly 45% (*n*=59/131) of the dog owners did not consider treatment a troublesome to them. However, the answers from the respondent might probably due to the effect of social desirability bias as the survey was conducted in an assisted manner. Hence, the true willingness to

comply to the treatment requires further survey study and follow up work to be done.

Cost remains to the main barrier of treatment in dogs diagnosed with heart disease. Financial commitment is considered the largest challenge for owners after their dogs diagnosed with heart disease because the cost can be higher following by more advanced disease and congestive heart failure (King,2012). According the study done by Volk e*t al.,* (2011), approximately 29% (*n*=10) of the dog owners were unable to afford the veterinary service, 26% (*n*=569/2188) of the owner agreed that they were consistently looked for less expensive veterinary options and a similar percentage of owners would switch to the less expensive veterinarian service. Nevertheless, most of the dog respondents in this study were female. Female owners tend to be more sensitive in cost of treatment compared to male owners (Volk *et al.,*2011).

There was a positive relationship between the owners' attitude and perceived behavioural control towards the intention to treat their dogs with heart disease. In this study, majority of the respondent were employed and having moderate monthly income. Hence, they were willing to let their dogs to receive treatment if they were diagnosed with heart disease despite that cost of treatment which was the main concern. However, the intention to treat among the dog owners of my study were not determined by the social pressure from the people around them. In fact, their attitude and their personal ability were the keys to decide whether their dogs should receive the heart disease treatment. This was

supported by a study which revealed that owners' understanding on the value of treatment, salary incomes, bond with their pets, their relationship with the vet, their perception and priorities of quality of life in their pets were the key determinants on intention to treat among the dog owners. (Todd, 2007)

From the study, empathic concern was found to moderate the relationship between the attitude and intention of treatment. This was supported by the study of perceptions and attitude of pet owners related to the impact of done by Todd (2007) stated that pet owners who exhibited stronger bond with their pet were more likely to seek more of preventive care, less sensitive of the price and more willing to comply to veterinarian recommendation of treatment regime. A stronger bond in this context was defined by specific owner behaviour related to their feeling towards their pet. Also, the research found that 80% of dog owners willing to spend any amount necessary to keep their pets healthy and 79% of them possessed stronger bond with their dogs were willing to follow their veterinarian recommend regardless of cost. Hence, there is a room for veterinarian to intervene by educating dog owners from low empathic concerns group so that they can change their attitude and elevate their intention to treat their dogs with heart disease.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

In conclusion, the level of awareness was high among the dog owners who visited to UVH but the level of knowledge of canine heart disease was poor.

Despite of the poor awareness and knowledge among the dog owners, they did not see treatment of canine heart disease as a troublesome to them. However, the major barriers of treatment among the dog owners was cost-related problem. The elevating of treatment cost often a major challenge to dog owners who majority from a moderate income group. A detailed cost plan for treatment can be constructed by veterinarian so that the owner can foresee their expenses and therefore cost-constraint no longer be a barrier of treatment.

The intention of treatment was found to positively associated with the attitude and perceived behavioural control which means that the owners' own perception of their personal ability and skills of care on their dog along with their personal attitude often determine their intention to bring their heart disease dogs to treatment.

Empathic concern of the dog owners towards their dogs was likely to affect their attitude and intention to treat their dogs. In fact, the bond between dog and dog owners plays a significant role in building good owner compliance

in canine heart disease treatment. Veterinarian can intervene by educating those low empathic concerns owners so that they can change their attitude to increase their intention to treat their dogs.

The limitation and challenge throughout the survey study was sample size limitation. Hence, my recommendation is one can increase the sample size with different geographical coverage and demographic background to capture the effect of empathic concern.

Another problem that occurred was that some owners completed the questionnaires in conjunction with input from friends or family members that accompanied them and resulting in a group opinion regarding the issues in question. Hence, one can refine the questionnaire' questions to reduce effect of social desirability bias especially in empathic concern question.

Furthermore, raising awareness of dog owner is essential to be conducted through education such as pet health awareness campaign as well as veterinary effort to deliver the reliable health information to owners via specific websites or guiding them to the reliable source of information in the website in order to provide an opportunity for veterinarians to take a more active role in meeting clients' information needs.

CHAPTER 7

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APPENDIX A: Questionnaire Study of Dog Owners' Perception towards Canine Heart Diseases

DOG OWNERS' DEMOGRAPHIC

1. Gender

☐ Male

☐ Female

2. Age

☐ Below 20 years

☐ 20 – 29 years

☐ 30 – 39 years

☐ 40 – 49 years

☐ Above 50 years

3. How many family members reside in your household?

_____

4. What is the approximate range of your monthly household income?

☐ Less than RM 2,000

☐ RM 2,001 – RM 5,000

☐ RM 5,001 – RM 10,000

☐ RM10,001 – RM 20,000

☐ More than RM 20,000

5. Employment Status

☐ Unemployed

☐ Self-employed

☐ Employed

☐ Retired

☐ Others: (please specify)_____

DOG OWNERSHIP INFORMATION

1. Currently, do you have a dog(s) under your care?

☐ Yes

☐ No

2. How many years of experience do you have in caring for a dog(s)? _____years

3. What is the purpose for having a dog in your household?

(Please "✓" one or more options where applicable)

☐ As a pet for myself

☐ As a pet for my children

☐ As a guard dog of my property

☐ As a companion

☐ As a helper/guide for my disability

☐ I am a breeder

☐ I rescue dogs

☐ Others: (please specify)_____

4. How long do you think a dog can live up to?

☐ Less than 2 years

☐ 2 – 5 years

☐ 5 – 10 years

☐ 10 – 15 years

☐ More than 15 years

1. Please list and fill in the details of each pet dog that you have / had.

Name of the dog	*Gender*		*How long have you cared for the dog?*	*Nature of the dog?*	*Is the dog healthy (as per today)?*		*If no, what disease is it suffering from?*	*Have you tried oral medication for this dog?*		*If yes, how did you administer?*	
1.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
2.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
3.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
4.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
5.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
6.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
7.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
8.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
9.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
10.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
11.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth
12.	M	F	***Year(s)***	Fierce / Good	Yes	No		Yes	No	Hide in food	Into the mouth

OWNER AWARENESS OF CANINE HEART DISEASE

1. Do you know that dogs can suffer from heart disease(s)?

☐ Yes

☐ Unsure

☐ No

2. How did you know that dogs can also have heart disease(s)?

☐ From previous experience of having a dog with heart disease

☐ Read up from pet book / magazine / newspaper

☐ Read up from the internet

☐ From a pet show / expo

☐ My dog's veterinary doctor told me

☐ My relatives or friends told me

☐ I saw a poster available in the veterinary clinic

☐ I was given a pamphlet obtained from the veterinary clinic

☐ Others: (please specify) _____

3. How well do you think you understand canine heart diseases?

1 Poor	2	3	4	5	6	7	8	9	10 Very good

4. Would you treat your dog if he/she has been diagnosed with heart disease?

☐ Yes

☐ Maybe

☐ No

5. What seems to be the barriers that challenge you from treating your dog(s)?

(You can choose more than one answer)

☐ Cost-related

☐ Time-related

☐ There is no cure for the heart disease

☐ No particular reason

☐ Others:(please specify) _____

6. Would the treatment regime be troublesome if the veterinarian told you that it is a life-long daily therapy?

☐ Yes

☐ Maybe

☐ No

7.Which of the followings in your opinion are clinical signs of a dog suffering from heart disease?

1. Which of the followings in your opinion are clinical signs of a dog suffering from heart disease? *(Please "✓", only one is allowed)*				
a)	Difficulty in breathing	Yes	No	Maybe
b)	Panting all the time	Yes	No	Maybe
c)	Panting even at rest	Yes	No	Maybe
d)	Pants longer these day after walk	Yes	No	Maybe
e)	No appetite	Yes	No	Maybe
f)	Vomiting	Yes	No	Maybe
g)	Diarrhoea	Yes	No	Maybe
h)	Syncope (Fainting)	Yes	No	Maybe
i)	Paralysis	Yes	No	Maybe
j)	Urinate all over the place	Yes	No	Maybe
k)	Cannot urinate	Yes	No	Maybe
l)	Drinks a lot of water	Yes	No	Maybe
m)	Seizure	Yes	No	Maybe
n)	Poor body score (Thin)	Yes	No	Maybe
o)	Exercise intolerance	Yes	No	Maybe
p)	Nasal discharge	Yes	No	Maybe
q)	Sneezing all the time	Yes	No	Maybe
r)	Dry cough	Yes	No	Maybe
s)	Cough with phlegm	Yes	No	Maybe
t)	Itchy skin	Yes	No	Maybe
u)	Sleep most of the time	Yes	No	Maybe
v)	Looks lethargy (tired)	Yes	No	Maybe
w)	Swollen legs	Yes	No	Maybe
x)	Big swollen belly	Yes	No	Maybe
y)	Others (Please specify) _____			

Answer the following that best reflects your experience with your dog, IF your dog was diagnosed with heart disease

	1. Intention to treat	Strongly Disagree						Strongly Agree
a)	I intend to follow-up with my dog's heart treatments.	1	2	3	4	5	6	7
b)	I intend to practice low salt diet.	1	2	3	4	5	6	7
c)	I intent to stop giving commercial treat(s) to my dog.	1	2	3	4	5	6	7
d)	I intend to administer medications recommended by the veterinarian.	1	2	3	4	5	6	7
e)	I intend to feed my dog with special formulated diet to support the heart.	1	2	3	4	5	6	7

	2. Perceived behavioural control	Strongly Disagree						Strongly Agree
a)	I have the resources (i.e. time and money) to support my dog's heart treatments.	1	2	3	4	5	6	7
b)	I am confident that I can nurse my dog according to the veterinarian's instruction.	1	2	3	4	5	6	7
c)	I can be committed to administer prescribed medication (long term) to my dog.	1	2	3	4	5	6	7
d)	I have the skills to administer oral drugs to my dog.	1	2	3	4	5	6	7

	3. *How important is the below person's support when you seek treatments for your dog?*	Strongly Disagree						Strongly Agree
a)	Family.	1	2	3	4	5	6	7
b)	Close friend(s).	1	2	3	4	5	6	7
c)	Peers/ Colleagues.	1	2	3	4	5	6	7
d)	Spouse.	1	2	3	4	5	6	7

	4. **Attitude**	Strongly Disagree						Strongly Agree
a)	It is wise to bring my dogs for his/her regular check-ups.	1	2	3	4	5	6	7
b)	It is a good idea to ensure that my dog is healthy.	1	2	3	4	5	6	7
c)	It is wise to begin the life-long therapy (medication) for the benefits of my dog's life.	1	2	3	4	5	6	7
d)	I will update my veterinarian during each check-ups on my dog's condition during treatment at home.	1	2	3	4	5	6	7
e)	I will get in touch immediately with my veterinarian when my dog suddenly look sick.	1	2	3	4	5	6	7

	1. **Empathic Concern**	Strongly Disagree						Strongly Agree
a)	I often have tender and concerned feelings for animals.	1	2	3	4	5	6	7
c)	My dog is a family member.	1	2	3	4	5	6	7
d)	I would describe myself as a pretty soft-hearted person.	1	2	3	4	5	6	7