

UNIVERSITY OF NAIROBI



**RETROSPECTIVE STUDY OF HEART CONDITIONS IN DOGS PRESENTED AT
SMALL ANIMAL CLINIC U.O.N**

A PROJECT REPORT SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR
THE AWARD OF BACHELORS DEGREE IN VETERINARY MEDICINE.

THE UNIVERSITY OF NAIROBI

SUBMITTED

BY

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J30/2059/2010

DEDICATION

To my wife Rose and lovely daughter Liz .

ACKNOWLEDGEMENT

I wish to express my sincere gratitude to God Almighty for His sufficient grace in my life.

I also wish to thank my supervisor, Dr J. M. A. Kitaa for his intellectual advice, informed suggestions, professional guidance and patience throughout the entire project work.

My appreciation also goes to the staff at clinical studies, my friends, classmates, and everybody else whose contribution enhanced the successful completion of this proposal. God bless you all.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION.....	iii
ACKNOWLEDGEMENT.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
1.0 INTRODUCTION.....	1
1.1 BACKGROUND INFORMATION	1
1.2 OBJECTIVES.....	1
1.3 JUSTIFICATION	2
1.4 HYPOTHESIS.....	2
CHAPTER TWO	3
2.0 LITERATURE REVIEW.....	3
2.1 TREATMENT	5
CHAPTER THREE.....	6
3.0 RESULTS	6
3.1 DISCUSSION	14
3.2 CONCLUSIONS.....	15
3.3 RECOMMENDATION.....	15
REFERENCES	16

LIST OF TABLES

Table 1:Table showing the prevalence of heart conditions over a period of 5 years.....	6
Table 2: Table showing the prevalence of heart conditions in different breeds of dogs	7
Table 3: Distribution of clinical signs at presentation of 51 dogs with different heart condition ...	8
Table 4:.comparison of heart condition prevalence in different sexes.....	9
Table 5: Comparison in prevalence of heart conditions by age.....	12

LIST OF FIGURES

Fig. 1: Graph showing the comparison in numbers of heart conditions in males and females in a period of five years.	10
Fig 2: Graph showing the comparison of heart conditions in different ages.....	13

LIST OF ABBREVIATIONS

GSD.....German shepherd dogs.

ECG.....Electrocardiogram.

DCM.....Dilated cardiomyopathy

CHF-.....Congestive heart failure

PE.....Pericardial effusions

HA.....Heart attack

HWD.....Heart worm disease

SHP.....Suspected heart problem.

ROT.....Rotweiler

St.b-.....st.Bearnard

ABSTRACT

A retrospective study of heart conditions presented, diagnosed and treated in the Small Animal Clinic, University of Nairobi during the period 2011 to 2015 was using recorded data. This survey therefore aims to document the prevalence of heart conditions according to breed, sex and age.

Diagnosis of different disease conditions were made on the basis of the history, clinical signs, laboratory tests eg hematology, chest x-rays and postmortem results. A total of 51 cases, were diagnosed with heart conditions and diseases. From the records 6 heart conditions were documented; congestive heart failure, heart attack, cardiomegally, pericardial effusions and heartworm disease. Cardiomegally had the highest occurrence (50.98%) followed by congestive heart failure (29.4%), pericardial effusions (9.8%), heartworm infection (5.9%), heart attack (1.96%) and suspected heart problems (1.96%). Heart diseases were significantly higher in adult dogs (98%) compared to younger dogs (2%). German shepherd dogs had a significantly high rate of heart conditions (37.25%) compared to cross breeds (17.6%), spitz (5.8%), labrador (5.8%), terriers (5.8%), boerboel (5%) and other unrecorded breeds (9.8%). German shepherd dogs had the highest rate of heart conditions than other breeds. This study documents cardiomegally and congestive heart failure as the commonest heart diseases in the Small Animal Clinic.

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

There is an increase in the clinical cases involving the heart that are reported which have far reaching implications on the general health of the animal ,mostly due to the changing lifestyles, where dogs and other pets are exposed to food that predispose to heart conditions (Tidholm *et al*, 2001)

The heart is a major organ in the body of an animal and many deaths have been caused by one or more heart conditions (Mowby, 2005). The heart is the first organ to be formed in vertebrates and congenital heart defects form a large percentage of birth defects in humans (Olson and Srivatsava, 1996.) Many etiologies have been documented to cause heart diseases inter alia hormonal, metabolic, infectious, degenerative, congenital and anaplastic. Diagnosis of heart conditions pose a problem due to the variable clinical signs which are not overt for heart disease (Tidholm, 2003.)

1.2 OBJECTIVES

1. The objectives for this study were:
2. To investigate the incidence of heart conditions according to breed..
3. To determine the major causes of heart conditions in dogs brought to the small animal clinic.

1.3 JUSTIFICATION

The data obtained from the records will give answers to the hypothesis and justify the objective of the study. Most importantly, the information gathered will be used to establish preventive methods on heart conditions .

1.4 HYPOTHESIS

1. Heart conditions are a major cause of mortality in Nairobi area

CHAPTER TWO

2.0 LITERATURE REVIEW

Studies have shown that heart conditions impose volume or pressure systolic mechanical overloads on the heart ,depresses myocardial contractility ,interfere with ventricular filling or increase systematic metabolic requirements, compromise cardiac function and elicit some combination of compensatory mechanisms.(Stafford M. 2008) .All these conditions are usually referred as heart failure (Ettigers and Edward 2005). Congestive heart failure may be limited to the venous circulation and body cavities draining into either the right or left used to designate which ventricular is failing and is responsible for the clinical manifestation .Failure of the right ventricle is associated with ascites, pleural effusion and peripheral edema ,where as pulmonary edema is the main feature of left ventricular failure,.(Summers ,2002).

Heart failure can be classified as acute and chronic depending on the time in which the condition develops. Heart failure can also be referred as a state wherein the cardiac output is inadequate to meet the perfusion needs of the metabolizing tissues and exercise capacity is limited (Tidholm 2003) .Inadequate tissue perfusion contributes to exercise intolerance ,azotemia and disturbances,such as metabolic acidosis (Tidholm ,2001). Several aetiologies have been documented on the causes of heart failure in canines and felines. These causes include,developmental anomalies , degenerative lesions , aortic stenosis, pulmonic stenosis,ventricular septal defects ,patent ductus arteriosus ,mitral valve dysplasia ,tricuspid

valve dysplasia, endocardial fibroelastosis and tetralogy of fallot (Tidholm ,1997)). Dogs with mitral valves disease,but without heart failure,appear normal to their owners. They generally have a detectable heart murmur on auscultation but may develop heart failure within several years of the onset of mitral valve disease (Haggstrom et al 2009). Most dogs die less than two years after onset of heart failure (Kittleson and Kienle 1998).Mitral valve regurgitation causes back flow of blood causing enlargement of the the heart interfering with breathing and cause coughing .As the disease progresses the the lungs becomes increasingly fluid filled . Dogs may show inappetance and weight loss(Prosek 2007). Mitral valve disease is the most common heart disease of dogs (Egenvall *et al* 2006).Many dog breeds are susceptible to mitral valve disease, especially small dog breeds such as cavalier king charles,spaniels ,cocker spaniels,toy and miniature poodles,pappillons, chihuahuas, dashhunds shitzus,and lhasa apsos (French 2005; Rishniw 2005; Lundin and Kwart 2010). It usually affects miniature schnuzers which have a genetic predisposition (Lewis *et al* 2010) .The most important causes for congestive heart failure in dogs and cats are degenerative valvular diseases,dilated cardiomyopathies, pericardial diseases and heartworm heart diseases (Tidholm, 1997). It is important that congenital heart conditions be identified in puppies so that an accurate prognosis can be given and, where accurate prognosis can be given and, where possible, surgical correction performed .

The most commonly encountered congenital heart conditions in dogs are patent ductus arteriosus, obstruction of the aortic and pulmonary outflow tracts, atrial and ventricular septal defects, mitral and tricuspid valve dysplasia, and tetralogy of Fallot (Fingland et al 1986; Lewitt 1989; Buchanan 1992; Bonagura and Darke 1995). Endocardial fibroelastosis is less often diagnosed in dogs (Bonagura *et al* 1995).Pericardial effusions is when fluid accumulates within the pericardial sac increasing the pressure progressively compressing the chambers of the heart .The

right sided chambers having thinner walls than the left are compressed at a greater degree (Merck, 2008). This causes a decrease in venous return causing jugular venous distension and ascites. The diagnosis of heart diseases involves a systematic examination that begins with consideration of species age, breed, and sex (Kittleson, 1998).

The history of clinical signs is variable and many patients have no overt clinical signs until congestive heart failure develops (Mowby, 2005). Careful and thorough history taking is invaluable in making a tentative diagnosis. Diagnostic aids used include a careful and thorough clinical history, electro-cardiography, chest x-rays, echocardiogram, electrophysiology, computer tomography, myocardial biopsy, heart magnetic resonance imaging, pericardiocentesis, and cardiac catheterization. (Hawkins, 2003)

2.1 TREATMENT

A large number of drugs impact the heart and the vascular system e.g Diuretics; eg furosemide for treatment of pulmonary edema. Positive inotropic drugs; increase the availability of calcium to cardiomyocytes hence enhancing the strength of heart contraction eg digitalis glycosides (digitoxin; digoxin) catecholamines eg dobutamine and dopamine)phosphodiesterase inhibitors.

Vasodilators and angiotensin converting enzyme inhibitors dilates arteries and veins eg nitrates calcium channel blockers. Anti arrhythmic drugs treat disorders of rhythm e.g lidocaine

CHAPTER THREE

3.0 RESULTS

From the records assessed in the year 2011-2015, the most important heart diseases were dilated cardiomyopathy (59.88%) followed by congestive heart failure (29.4%) then pericardial effusions (9.8%). The least important heart disease was heart attack (1.96%).(Table 1 and Figure 1).

Table 1:Table showing the prevalence of heart conditions over a period of 5 years.

CASES	2011	2012	2013	2014	2015	TOTAL	%
DCM	9	3	1	10	3	26	50.9
CHF	8	2	2	3	0	15	29.4
PE	2	0	0	3	0	5	9.8
HA	0	0	0	1	0	1	1.96
HWD	2	0	0	1	0	3	5.9
SHB	0	0	0	1	0	1	1.96
TOTAL	21	5	3	19	3	51	100

DCM-Dilated cardiomyopathy, CHF-congestive heart failure, PE-pericardial effusions

HA-heart attack, HWD-Heart worm disease, SHP-Suspected heart problem

The German Shepherd Dog breed had the highest number of heart conditions(16), followed by cross breed dogs, Boerboel(9), Labrador(4) and Spitz(4) respectively. Rotweilers had the least number of cases (2) (Table 2)

Table 2: Table showing the prevalence of heart conditions in different breeds of dogs

DISEASE	Gsd	Boerboel	Spitz	Cross	labrador	terrier	rot	St.b	others
DCM	10	1	2	5	1	0	0	2	5
CHF	3	2	1	3	0	3	2	1	0
PE	3	0	0	0	2	0	0	0	0
HA	1	0	0	0	0	0	0	0	0
HWD	1	0	1	0	1	0	0	0	0
STP	1	0	0	0	0	0	0	0	0
TOTAL	19	3	4	9	4	3	2	3	5

DCM-Dilated cardiomyopathy, CHF-congestive heart failure, PE-pericardial effusions

HA-heart attack, HWD-Heart worm disease, SHP-Suspected heart problem

The most common clinical signs at presentation of dogs at the small animal clinic were depression(11), exercise intolerance(15), tachypnoea(12), dyspnoea(9) and ascites.(4) respectively (Table 3).

Table 3: Distribution of clinical signs at presentation of 51 dogs with different heart condition

CLINICAL SIGNS AT PRESENTATION	FREQUENCY
Depression	11
Exercise intolerance	15
Ascites	4
Tachypnoea	12
Dyspnoea	9

The ratio of male to female was 1: 1 and hence no sex predilection was elucidated from the results of this findings. Number of male to females was 26 and 25 respectively .The number of male dogs with dilated cardiomyopathy was higher (16) than in females(10) (Table 4 and fig 2).

Table 4:.comparison of heart condition prevalence in different sexes.

DISEASES	MALE	FEMALE	TOTALS
DCM	16	10	26
CHF	5	10	15
PE	3	2	5
HA	0	1	1
HWD	1	2	3
SHB	1	0	1
TOTAL	26	25	51

DCM-Dilated cardiomyopathy, CHF-congestive heart failure, PE-pericardial effusions

HA-heart attack, HWD-Heart worm disease, SHP-Suspected heart problem

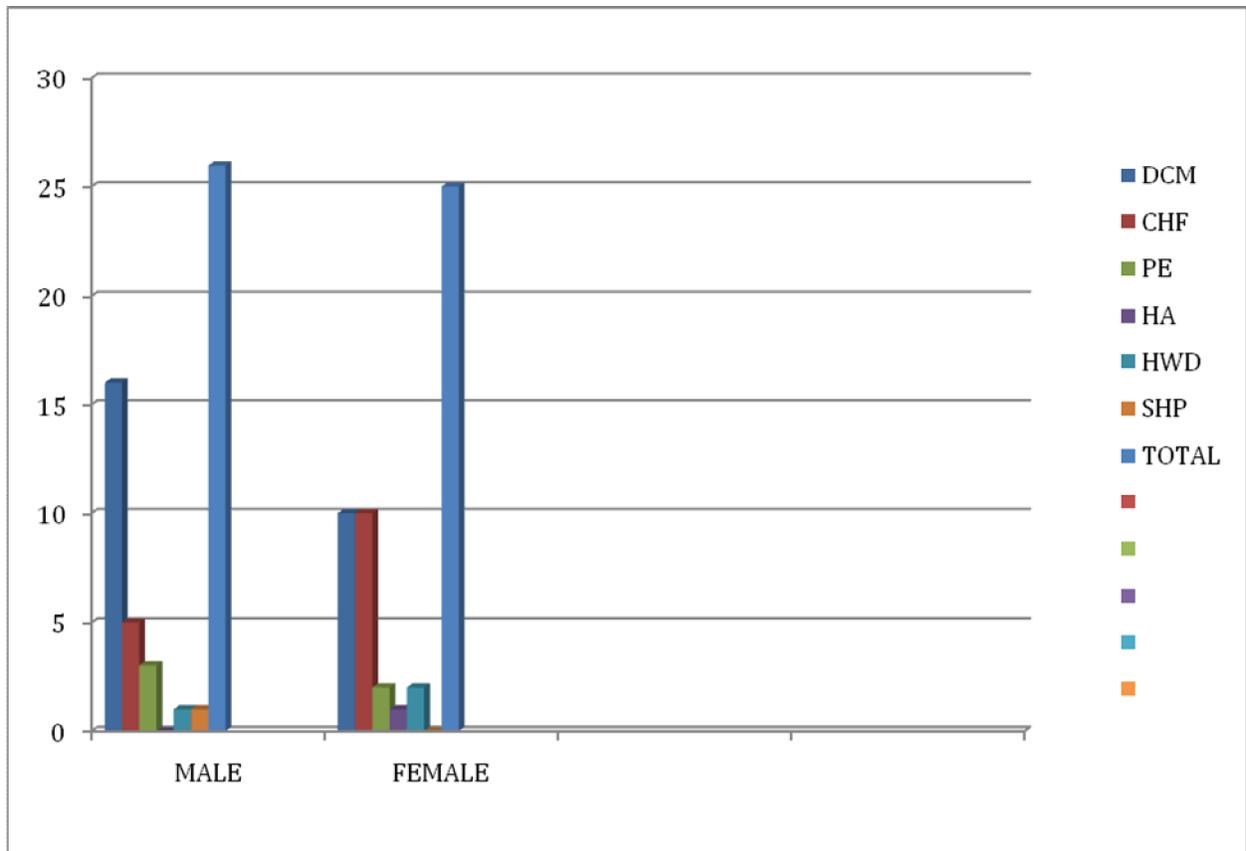


Fig.1: Graph showing the comparison in numbers of heart conditions in males and females in a period of five years.

DCM-Dilated cardiomyopathy, CHF-congestive heart failure, PE-pericardial effusions

HA-heart attack, HWD-Heart worm disease, SHP-Suspected heart problem

The adults (46) had a higher prevalence of heart conditions than puppies(5).

Table 4: Comparison in prevalence of heart conditions by age.

DISEASE	PUPPIES	ADULTS	TOTAL
DCM	0	26	26
CHF	1	14	15
PE	1	4	5
HA	1	0	1
HWD	1	2	3
SHP	1	0	1
TOTAL	5	46	51

DCM-Dilated cardiomyopathy, CHF-congestive heart failure, PE-pericardial effusions

HA-heart attack, HWD-Heart worm disease, SHP-Suspected heart problem

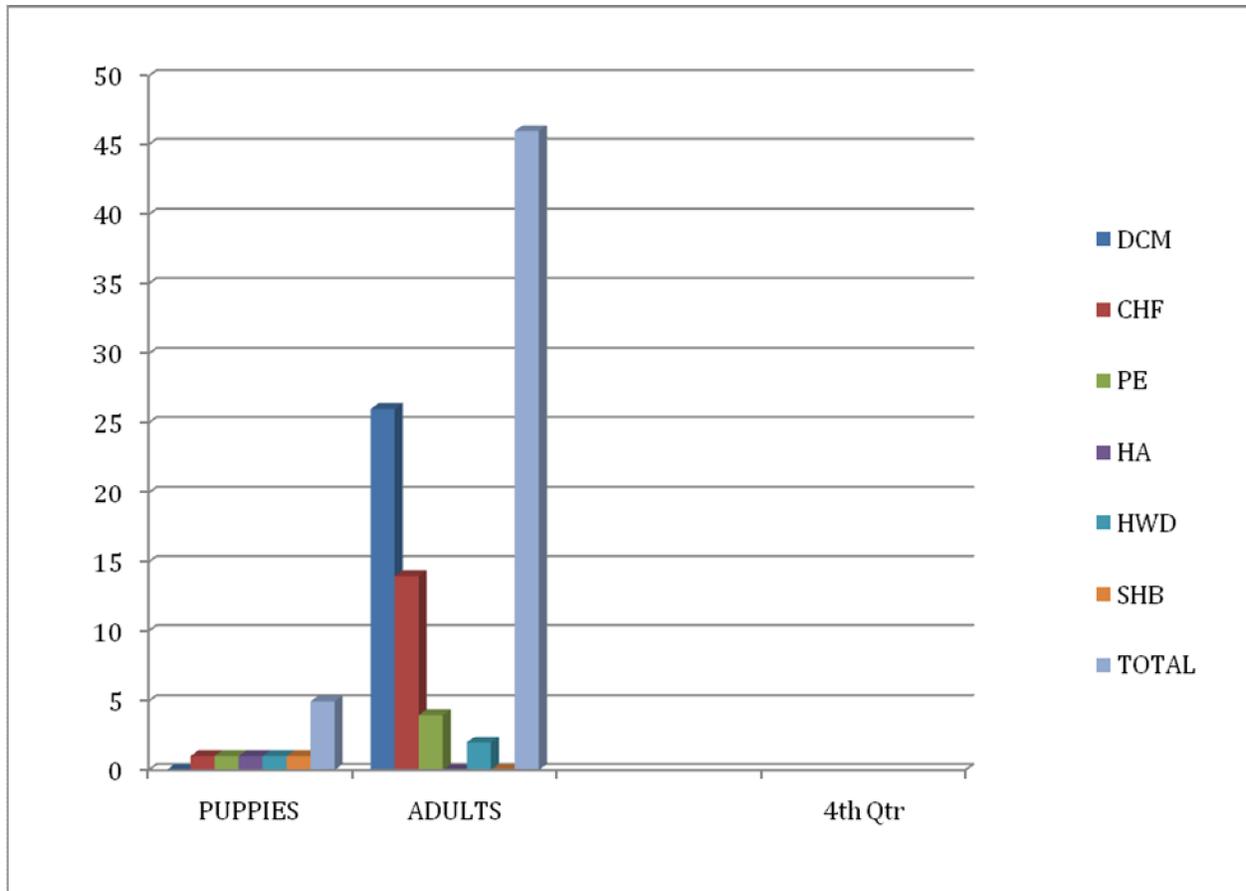


Fig 2: Graph showing the comparison of heart conditions in different ages.

DCM-Dilated cardiomyopathy, CHF-congestive heart failure, PE-pericardial effusions

HA-heart attack, HWD-Heart worm disease, SHP-Suspected heart problem

3.1 DISCUSSION

This study has found dilated cardiomyopathy at 59.4%, which commonly affects large breed dogs, as the most common acquired cardiac disease. This finding is in agreement with a study by (Tidholm *et al*). (2001) on cumulative prevalence of dilated cardiomyopathy in large, breeds of dogs where the dobermans had a cumulative prevalence of 52.2%. Congestive heart failure was the second most common condition at (29.4%). Congestive heart failure is usually a sequele of other cardiac diseases such as dilated cardiomyopathy. This could explain why the frequency of congestive heart failure is also high according to the results of this study. This also goes in line with a study conducted on diagnosis of heart failure (Stafford 2008)

The major clinical signs in dogs with dilated cardiomyopathy were ascites ,coughing,and heart murmurs which were acute in onset. This is consistent with a study done on common disease in companion animals (Summers 2002). Tachypnoea,dyspnoea, anorexia and exercise intolerance were the major symptoms in dogs diagnosed with heart diseases. This is consistent to a study where dyspnoea,tachypnoea,and exercise intolerance were the major clinical signs in dogs presented with congestive heart failure and other heart conditions (Hawkins, 2003). However,increased respiratory rate,dyspnoea may be manifestation of other causes eg dirofilariosis,anaemia,metabolic acidosis,hyperthermia,and pain (Mowby,2005) (Muir *et al*,2007).

The diagnostic methods used in this study were interpretation of the overall physical examination,blood exam,urinalysis , radiography ,and echocardiography. This was in line with a study performed on heart conditions and their diagnoses (Kittleson *et al* 1998). Dilofilariosis is an important disease in kenya mostly in the coast. The low frequency of this condition in this

study could be due to the geographical location. This is in line with a study done along the Kenyan coast where the prevalence of dilofilariosis was 17.3% (Joseph 1994). This study noted a higher occurrence of pericardial effusions and heart worm disease in adults than puppies. This is consistent with another study on prevalence of heart conditions in different ages and sex of dogs (Stafford ,2008).

3.2 CONCLUSIONS

From this study the following conclusions were made;

1. The most common heart conditions were dilated cardio-myopathy, congestive heart failure, and pericardial effusions.
2. Adult dogs had a high degree of heart conditions than younger dogs.

3.3 RECOMMENDATION

This study documented the common cardiac conditions and diseases in the small animal clinic university of Nairobi .However did not show the preventive measures against these diseases hence recommend for further research to come up with the appropriate preventive, control and eradication measures.

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