

**DISEASE PREVALENCE AND CLINICOPATHOLOGICAL CHANGES IN SENIOR AND GERIATRIC CATS PRESENTED TO UNIVERSITY VETERINARY HOSPITAL, UNIVERSITI PUTRA MALAYSIA**

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**Abstract**

This retrospective study reports on the prevalence of disease, clinicopathological changes and diagnosis in senior and geriatric cats presented to University Veterinary Hospital (UVH), Universiti Putra Malaysia between 2009 and 2011. The age distribution of cats presented to UVH, level of preventive health care and cost of treatment per cat per annum were also determined. The majority of the feline patients were less than 3 years old. Senior and geriatric cats made up 1.4% of all cats in the study. Kidney disease, dental disease, neoplasia and feline upper respiratory tract disease were the most commonly reported disorders in senior and geriatric cats. Furthermore, blood lymphocytes count and albumin level were significantly lower in older cats compared to adult as a result of immuno-senescence and age-related physiological changes. Preventive care was poor for senior and geriatric cats, with only 9% presented for wellness examination. In general, cost of veterinary care was significantly lower for those that received preventive health care than those that did not. The results from this study can be used by veterinary practitioners to better understand, anticipate health problems of senior and geriatric cats and to encourage clients to subscribe to a semi-annual wellness programme for their older cats.

**Keywords:** senior, geriatric, cats, preventive care, kidney disease

**INTRODUCTION**

Just like humans, cats are now living longer; the greying population continues to grow. For example, in Canada more than 35% of cats are greater than 8 years old and in United States 30-40% of the cat population are senior cats (Little, 2011). Cat life expectancy has also risen reaching an average age of 14 to 16 years. The term ‘senior’ has been used to describe the aging group of companion animals and those in their last 25% of their expected life-span (Epstein *et al.*, 2005). The Association of American Feline Practitioners defines senior cats as 11 to 14 years old and geriatric cats as 15 years or older. The most common causes of death in senior cats are renal failure, cancer, and infectious disease (Hoskins, 1997). There are marked increase in incidence of some

illnesses related to age in senior cats compared to adult cats, which consist of metabolic disturbances related to the urinary tract (chronic kidney disease, lower urinary tract disorders), endocrine system (hyperthyroidism, diabetes mellitus), osteoarthritis, dental diseases and neoplasia (Scheck, 2009). Even though the impact of aging is irreversible, with the intervention of nutrition and regular wellness examination, many of these conditions could be controlled and indirectly improve the quality of life of these cats. Furthermore, regular senior wellness examination can help in early detection of diseases and early interventions could be taken. However, there is a scarcity of information on the population of senior cats, general health and disease conditions in adult and senior cats in Malaysia. This study was conducted to provide data on the disease status of geriatric cats which will form the database for clinicians and diagnosticians to use in the management of these cats.

## **MATERIALS AND METHODS**

The medical records of the University Veterinary Hospital (UVH), Universiti Putra Malaysia from January 2009 to December 2011 were searched for cases of adult (3-6 years old), mature (7-10 years old), senior (11-14 years old) and geriatric (15 years old and above) cats. These medical records were reviewed and information collected were signalment of patient (case number, patient identification, sex, breed, age, vaccination and deworming status and body condition score), number of visits throughout the year, diagnosis and cost of treatment. In addition, the haematology and serum biochemistry results were also obtained for 17 clinically healthy cats aged 3-6 years and 10 years and above to determine age-related changes.

### *Statistical Analysis*

The statistical analyses were made using SPSS version 19.0. Descriptive statistics, including means and standard errors of means for continuous data and frequency for categorical data, were produced. Pearson Chi-square Test was used to assess associations between categorical variables and odd ratio to determine the likelihood of diseases in different age groups. Independent T-test was used to test the statistical significance of differences between continuous variables. Significance for all analyses was set at 0.05.

## **RESULTS AND DISCUSSION**

The majority (79.4%) of feline patients were found to be less than 3 years old. Senior and geriatric cats were 1.4% of all cats. This proportion was low compared to counterparts in the United States where 19.1% of cats presented to private veterinary practices were aged 10 years and above (Lund *et al.*, 1999). The difference in senior population in Malaysia from that in developed countries could be due to environmental factors, since most of cats in Malaysia are outdoor cats and roam freely, which make them more prone to infection and fatal motor vehicle accidents.

Clinicopathological findings of healthy adult and senior cats showed that there was no significant difference ( $p>0.05$ ) in erythrocyte parameters. However, the total leucocyte, segmented neutrophils, and monocytes counts were significantly higher

( $p < 0.05$ ), and lymphocytes were significant lower ( $p < 0.05$ ) in older than young cats. This is contrasted with a previous study by Campbell *et al.* (2006), where it was shown that older cats were found to have lower total leucocyte and neutrophil counts. It is probably attributable to the free roamer status of most cats in Malaysia, which constantly expose them to various infectious agents. Being senior cats with poor immune response, response to infections takes, thus causing increase in circulating leucocyte counts. However, consistent with other studies, the circulating lymphocytes in senior cats was low (Campbell *et al.*, 2004; Heaton *et al.*, 2001). These decreases were in CD4+ T cells, B cells and natural killer cells due to age-related immunological changes in cats (Day, 2010). This is the reason why senior cats are more susceptible to infection and neoplasia. Albumin was significant lower in older than young cats because of decreased nutrient digestibility and hepatic function in older cats (Harper, 1998) (Table 1).

**Table 1.** Haematology and biochemical parameters of cats presented to Universiti Veterinary Hospital, Universiti Putra Malaysia

Parameter	Age (years)	
	3-6 (n=17)	>10 (n=17)
RBC ( $\times 10^{12}/L$ )	7.49 $\pm$ 0.34	7.221 $\pm$ 0.375
Hg (g/L)	117.12 $\pm$ 5.45	113.818 $\pm$ 4.639
PCV (L/L)	0.33 $\pm$ 0.01	0.315 $\pm$ 0.011
WBC ( $\times 10^9/L$ )	11.19 $\pm$ 0.76	14.406 $\pm$ 1.280
Band neutrophils ( $\times 10^9/L$ )	0.36 $\pm$ 0.06	0.35 $\pm$ 0.11
Seg neutrophils ( $\times 10^9/L$ )	7.30* $\pm$ 0.64	10.10 $\pm$ 1.00
Lymphocytes ( $\times 10^9/L$ )	2.24* $\pm$ 0.23	1.38 $\pm$ 0.11
Monocytes ( $\times 10^9/L$ )	0.35* $\pm$ 0.03	0.57 $\pm$ 0.07
Eosinophils ( $\times 10^9/L$ )	0.88 $\pm$ 0.13	1.19 $\pm$ 0.27
Urea (mmol/L)	8.24 $\pm$ 0.46	9.78 $\pm$ 0.67
Creatinine ( $\mu$ mol/L)	129.82 $\pm$ 5.20	138.71 $\pm$ 8.00
ALT (U/L)	54.43 $\pm$ 6.60	49.49 $\pm$ 5.63
Albumin (g/L)	32.73* $\pm$ 0.69	27.63 $\pm$ 1.47
Globulin (g/L)	47.25 $\pm$ 2.96	52.28 $\pm$ 3.43

\* For each row, means are significantly different ( $p < 0.05$ )

The most common diseases reported in geriatric cats presented to UVH were kidney disease (33.3%), feline upper respiratory tract disease (33.3%), mammary gland tumours (11%) and wound (11%), while in senior cats there were dental disease (24%), kidney disease (17%), feline upper respiratory tract disease (17%) and skin tumour (10%). However, in middle-aged cats, feline upper respiratory tract disease (11%), wound (10%), dental disease (9%) and kidney disease (8%) were among the top 4 conditions. In contrast, ectoparasitism (12%) was the most common disease reported in adult cats and followed by Feline upper respiratory tract disease (11%), wound (10%) and sporotrichosis (8%) (Table 2).

The frequency of kidney disease increased with age; geriatric cats had the highest frequency of the disease (33.3%) followed by senior cats (17.2%). Odds ratio showed that senior and geriatric cats were 3 times ( $\chi^2 = 10.233$ ,  $p = 0.001$ ) more likely to have kidney disease compared to middle-aged cats and 7 times ( $\chi^2 = 37.132$ ,  $p = 0.000$ )

compared to adult cats. Age is indeed an important risk factor for kidney disease. Dibartola *et al.* (1987) and Watson (2001) reported that chronic kidney disease affected 7.7% of cats over 10 years old and 15.3% of those over 15 years old. The increase in frequency of kidney disease in older cats could be due to age-related physiological changes. Kidneys of senior cats are smaller in size; there is decrease in tubular size and increased fibrosis. These changes cause a decreased glomerular filtration rate and blood flow and thus a decline in kidney function.

**Table 2.** Frequency of diseases in cats presented to Universiti Veterinary Hospital, Universiti Putra Malaysia for the period of 2009-2011

Diseases	Age (Years)							
	3-6		7-10		11-14		≥15	
	n	%	n	%	n	%	n	%
<b>Urinary system</b>								
Kidney disease	23	3.8	16	7.6	10	17.2	6	33.3
Non-obstructive FLUTD	28	4.6	10	4.7	4	6.9	0	0
Obstructive FLUTD	15	2.5	6	2.8	0	0	0	0
<b>Dental disease</b>								
FURD	64	10.6	23	10.9	9	15.5	3	16.7
<b>Integument system</b>								
Wound/abscess	63	10.4	21	10.0	2	3.4	2	11.1
Ectoparasites	71	11.8	13	6.2	6	10.3	0	0
Sporotrichosis/fungal infection	50	8.3	7	3.3	3	5	1	5.6
<b>Diabetes mellitus</b>								
	2	0.3	3	1.4	2	3.4	1	5.6
<b>Tumours</b>								
Mammary gland tumour	1	0.2	8	3.8	1	1.7	2	11.1
Skin tumours	2	0.3	3	1.4	6	10.3	1	5.6

In this study, most of the cats were presented only when they were sick. Only 3% of senior cats were presented for wellness examination, as compared to the United States where more than 14 % of senior cats received regular wellness examination. The level of preventive care was reflected in the cost of veterinary care. The veterinary care expenditure in adult and senior cats was quite similar, ranging from RM321 to RM473 per year. However, the veterinary care costs for cats that received preventive health care were lower than in those that did not. The reason was that when cats were presented for preventive health care, early detection of disease could be done, resulting in easier disease management, which was less costly and more successful than crisis management (Epstein *et al.*, 2005).

In summary, senior and geriatric cats made up only a small proportion of feline patients at UVH. Kidney disease, dental disease and neoplasia were among the top three conditions in senior and geriatric cats. Blood lymphocyte count was significantly lower in older cats. Preventive care for feline patients can be improved. Cost of veterinary care is cheaper in the long run if cats received preventive health care.

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