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The effect of obesity on health-related quality of life in dogs

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Abstract

Obesity in dogs is a multifactorial disease characterized by excessive fat accumulation, by inadequate physical activity, genetic predisposition, metabolic factors, and the gut microbiome. In humans, obesity is associated with lower activity levels, increased pain, and reduced energy, which can decrease quality of life and shorten lifespan. This study evaluated quality of life in eleven obese and eleven normal-weight dogs, classified by body weight and body condition scoring, regardless of age, sex, or breed. Health-related quality of life (HRQoL) was evaluated based on the responses provided by the dogs' owners to a questionnaire. The responses were converted into scores reflecting food-seeking behaviour, pain levels, vitality, frequency of treat giving, sucrose preference, the owner's physical activity, BMI, employment status, and their perception of the dog's body weight. Results showed that food-seeking behaviour and pain scores increased significantly with higher Body Fat Index, while vitality scores decreased with increased BFI. Obesity was significantly associated with higher treat intake ($p < 0.05$), including rice, curry leftovers, biscuits, and peanut brittle, and with a stronger preference for sucrose ($p < 0.01$) compared to normal-weight dogs. A significant difference was observed in body weight perception by owners between the ideal weight group and the obese group ($p < 0.01$). However, there were no significant differences in owner BMI, physical activity, or employment status between the ideal weight group and the obese group. The results suggested that HRQoL is reduced in overweight and obese dogs compared to those with a healthy body weight.

Keywords: BCS, BFI, BMI, Dogs, HRQoL, obesity, healthy body weight

Introduction

Obesity is a disease characterized by excessive body fat accumulation. It results from a positive energy balance, where energy intake exceeds energy expenditure (German, 2006) [5]. Overweight and obesity are more common in companion dog populations, leading to diseases, discomfort, and a decline in the overall Health-Related Quality of Life (HRQoL) of the affected animals (Schneider *et al.*, 2010) [16]. Dogs are generally considered overweight when their body weight is 15-30 percent above the ideal, whereas those exceeding their ideal weight by more than 30 percent are classified as obese, as per Ramsey and German (2008) [14]. Obesity is a global concern affecting both humans and companion animals. According to the National Family Health Survey-5, the overall weighted prevalence of obesity among Indian adults is 44.02 percent in men and 41.16 percent in women and increase from 37.71 percent and 36.14 percent, respectively, as reported in NFHS-4 indicating a worrying upward trend. A similar pattern is evident in dogs. In a study involving 2,332 dogs, Mounika *et al.* (2020) [12] found that 18.57 percent were overweight, while 31.39 percent were obese. When dogs become obese, their behaviour and responsiveness toward their owners change. They fall ill and require veterinary care. A pet's illness always affects the well-being of its owner. To address this issue, a questionnaire-based study was conducted to evaluate HRQoL in both obese and ideal weight dogs. The primary objective of this study was to determine whether overweight and obese dogs experience a decline in HRQoL compared to dogs with an ideal body weight.

Materials and Methods

The current study was conducted on dogs brought to the Teaching Veterinary Clinical Complex, Pookode, from March 2025 to July 2025. A total of 60 dogs were screened based on body condition score and body weight. Regardless of age and gender, eleven clinically healthy dogs without any visible signs of obesity or overweight, presented for routine check-ups, were selected as the control group. These dogs were active, alert, and had normal appetite, bowel movement, defecation, and urination. The body weight of the dogs was determined according to the guidelines provided by Nelson and Couto (2019) [13]. Eleven dogs, whose body weight exceeded 10 per cent of their ideal weight, were considered overweight (Hand *et al.*, 2010) [7], while those weighing 15 to 20 per cent more than their ideal weight were classified as obese (Mawby *et al.*, 2004) [11]. The body condition score (BCS) of the dogs was evaluated using a 9-point scale, assigning whole number values from 1 to 9, as outlined by Laflamme (1997). A BCS of 5 represented an ideal body weight, and each point increase in BCS indicated being 10 per cent overweight (Brooks *et al.*, 2014) [1]. Body Mass Index (BMI) was calculated using the modified formula: Modified Body Mass Index (MBMI, kg/m²) = Body Weight (BW) / [Truncal Length (TL)]² (Thengchaisri *et al.*, 2014) and Body Fat Index (BFI) was calculated using the formulas: for males, Body Fat (per cent) = $-1.4 \times \text{HS} + 0.77 \times \text{PC} + 4$, and females, Body Fat (per cent) = $-1.7 \times \text{HS} + 0.93 \times \text{PC} + 5$, where HS represents the length from the calcaneal tuber to the mid-patellar ligament (hock to stifle), and PC refers to the pelvic circumference. The present study involved a total of 22 dogs and their owners. These dogs were randomly selected for the study, with 11 classified as having an ideal body weight and the remaining 11 identified as obese.

HRQoL was evaluated using a questionnaire based on owner-reported information covering various factors, including food-seeking behaviour, pain, vitality, treat frequency, sucrose preference, owner's physical activity, BMI, employment status, and their perception of the dog's body weight. The questionnaire used simple descriptive terms some reflecting positive health aspects, others indicating negative health aspects. Each descriptor was rated either with a 2-point Likert scale for treats consumed (Yes/No) and sucrose preference (High/Low), or with a 3-point (0-3) Likert scale for food-seeking behaviour, pain score, and vitality score, allowing owners to rate how well each term described their dog. When a 3-point scale was used, such as for 'Pain', 0 meant "Minimal pain," 1 indicated "Mild pain", 2 meant "Moderate pain," and 3 indicated "Severe pain" (Wiseman-Orr *et al.*, 2006) [19]. The study also examined the relationship between the dog's BMI and various factors such as the owner's physical activity level, body mass index, employment status, and owners' perceptions of their dog's body condition.

All data used for analysis were recorded in a Microsoft Excel spreadsheet. Only dogs whose owners completed the questionnaire were included. A total of 28 dog owners were approached, but 6 declined to complete the questionnaire, stating that they preferred their dog to appear round and liked it being obese. All statistical procedures were performed using IBM SPSS version 24. Spearman's Rank correlation was used to analyse the relationship between scores for food-seeking behaviour, pain, and vitality, with statistical significance defined at 0.01 level. The Chi-square test with continuity correction was applied to compare treat frequency between the ideal weight and obese groups, considering a significance level of 1.5 Fisher's exact test was employed to

compare sucrose preference, owner physical activity, BMI, employment status, and body weight perception between the ideal weight and obese groups.

Results

Among the 11 dogs whose body weight was more than 10 to 20 per cent above their ideal weight, 81.88 per cent were assigned a BCS of 7, while 18.22 per cent had a BCS of 8. The group consisted of 54.55 per cent females and 45.55 per cent males, with ages ranging from 2 to 9 years. Labrador Retrievers were the most common breed (63.66 per cent), followed by Beagles (18.18 per cent), German Shepherds (9.09 per cent), and Golden Retrievers (9.09 per cent) (Figure 1).

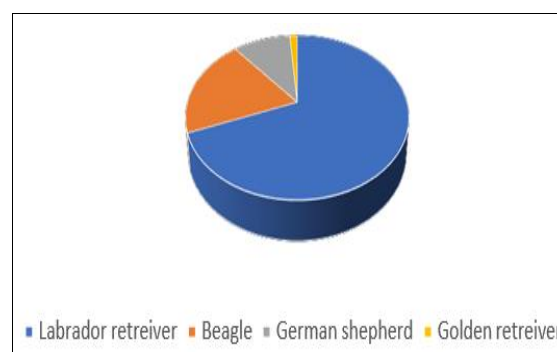


Fig 1: Breed-wise distribution

The comorbidities associated with obesity observed in this study included gastrointestinal conditions (36.36 per cent), dermatological issues (36.36 per cent), respiratory problems (18.18 per cent), and gynaecological disorders (9 per cent) (Figure 2).

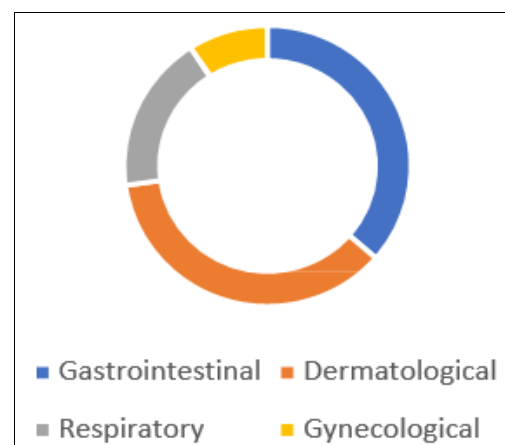


Fig 2: Co-morbidities associated with obesity

The study found that as BFI increased, food-seeking behaviour and pain scores also increased, while vitality scores decreased. These relationships were statistically confirmed using Spearman's rank correlation analysis (Table 1) and visually represented through a box plot (Figure 3). The boxplot illustrates a clear inverse correlation between vitality score and BFI.

Table 1: Relation of BFI with food seeking behaviour, pain Score and Vitality score

Variables	Correlation with BFI	P-Value
Food seeking behaviour	0.670**	0.001
Pain score	0.810**	< 0.001
Vitality score	-0.807**	< 0.001

** Significant at 0.01 level

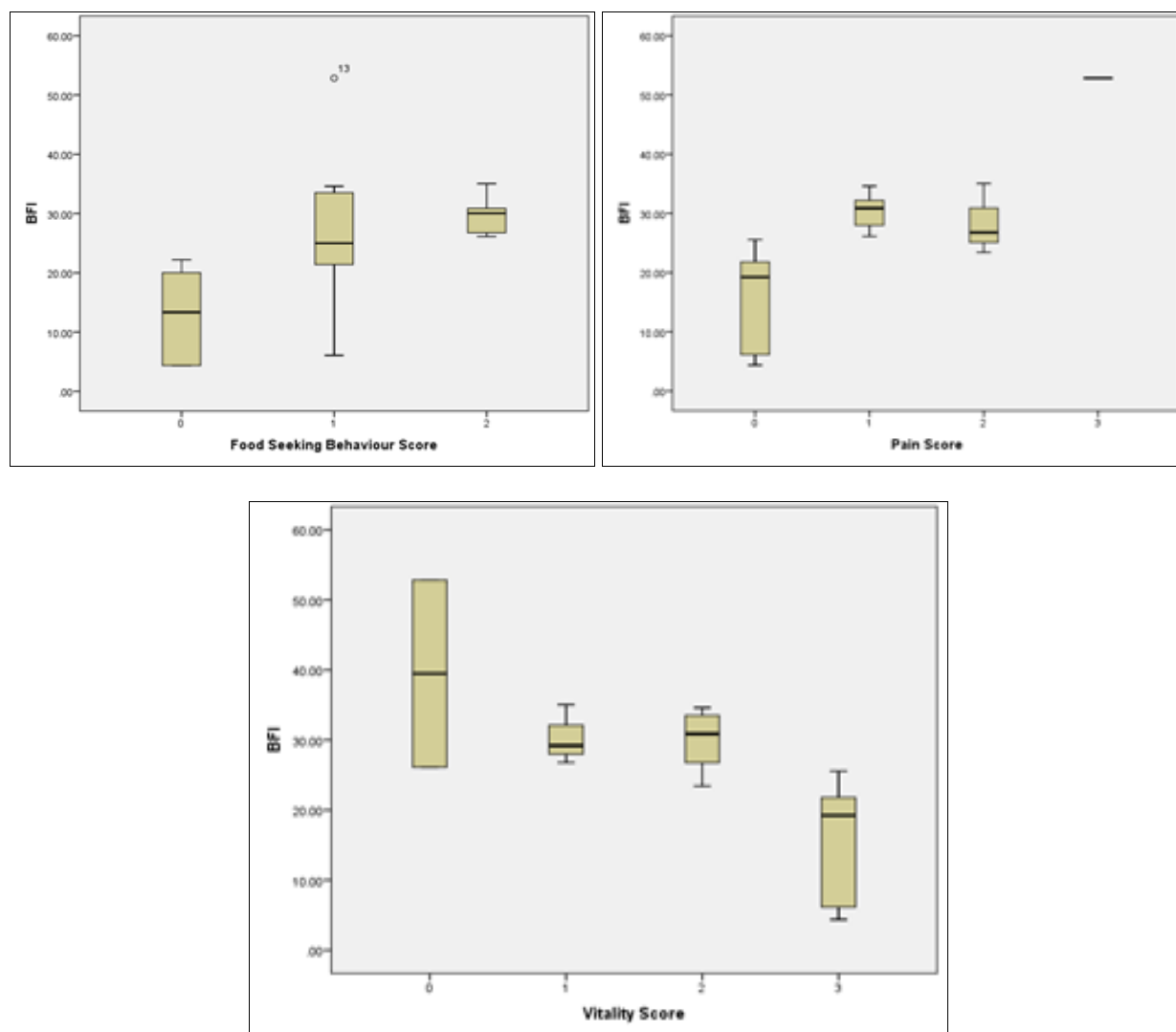


Fig 3: Box plot of Food seeking behaviour, Pain score and Vitality score

A significant link was observed between treat consumption and obesity in dogs (Table 2) suggesting that obese dogs were more frequently given treats such as rice, curry leftovers, human biscuits such as Parle-G and Marie, peanut brittle than dogs of normal weight. A higher significant association was found between sucrose preference and obesity in dogs (Table 3)

Table 2: Comparison of treats among ideal weight group and obese group

Treats	Ideal weight (Count)	Ideal weight (within Group %)	Obese (Count)	Obese (within Group %)
No	9	81.8	3	27.3
Yes	2	18.2	8	72.7
Total	11	100	11	100

Chi-square value = 4.583*; P-value = 0.032

* Significant at 0.05 level

Table 3: Comparison of sucrose preference among ideal weight group and obese group

Sucrose preference	Ideal weight (Count)	Ideal weight (within Group %)	Obese (Count)	Obese (within Group %)
High	0	0	9	81.8
Low	11	100	2	18.2
Total	11	100	11	100

Fisher's exact P-value < 0.001**

** Significant at 0.01 level

The study found that owners of obese dogs were significantly more likely to underestimate their pet's weight than those with dogs of ideal weight (Table 4).

Table 4: Body weight perception among ideal weight group and obese group

Body weight perception	Ideal weight (Count)	Ideal weight (within Group %)	Obese (Count)	Obese (within Group %)
Agreement	11	100	1	9.1
Underestimation	0	0	10	90.9
Total	11	100	11	100

Fisher's exact P-Value < 0.001**

** Significant at 0.01 level

Table 5: Owner physical activity among ideal weight group and obese group

Owner physical activity	Ideal weight (Count)	Ideal weight (within Group %)	Obese (Count)	Obese (within Group %)
0-2 days	9	81.8	7	63.6
3-4 days	0	0	1	9.1
> 4 days	2	18.2	3	27.3
Total	11	100	11	100

Fisher's exact P-Value = 0.635^{ns}

NS: Non-Significant

Table 6: Owner BMI among ideal weight group and obese group

Owner BMI	Ideal weight (Count)	Ideal weight (within Group %)	Obese (Count)	Obese (within Group %)
Normal	9	81.8	4	36.4
Overweight	1	9.1	4	36.4
Obese	1	9.1	3	27.3
Total	11	100	11	100

Statistical test: Fisher's exact test

P-Value=0.161 (NS=Not-Significant)

Table 7: Owner employment among ideal weight group and obese group

Owner employment	Ideal weight (Count)	Ideal weight (within Group %)	Obese (Count)	Obese (within Group %)
Retired	1	9.1	2	18.2
Working	10	90.9	9	81.8
Total	11	100	11	100

Statistical test: Fisher's exact test

P-Value=1.000 (NS=Not-Significant)

There was no significant variation in the BMI of dogs in relation to the physical activity levels of their owners (Table 5). There was no significant variation in the BMI of dogs to their owners' BMI (Table 6). The study showed no significant difference in owner employment status between the ideal weight and obese dog groups, with most owners in both groups being employed (90.9 per cent in the ideal weight group vs. 81.8 per cent in the obese group (Table 7).

Discussion and Conclusion

The present study aimed to evaluate the impact of obesity on the health-related quality of life (HRQoL) of dogs. Labrador Retrievers were the most frequently represented breed, a finding consistent with the higher prevalence reported by Siji *et al.* (2016). Results indicated that as body fat index (BFI) increased, food-seeking behaviour and pain scores also rose, while vitality scores declined. The observed increase in food-seeking tendencies with rising BFI supports the view of Laflamme (2012) [9], who noted that heightened appetite can lead to greater calorie intake and subsequent fat accumulation in dogs. Similarly, higher pain scores were associated with increased BFI, aligning with Silva and Lima (2020) [4], who suggested that excess body fat imposes mechanical strain on joints and tissues, contributing to discomfort. Dogs with lower vitality scores (score 0) generally had higher BFI values, reflecting overweight or obese conditions. German *et al.* (2012) [6] similarly reported that weight loss programs in dogs resulted in improved vitality scores ($p < 0.001$) alongside reductions in BFI.

A significant relationship was identified between treat consumption and obesity, supporting the findings of Heuberger and Wakshlag (2011) [8], who emphasized that feeding practices such as providing table scraps and treats play a major role in weight gain due to their high caloric contribution and poor nutritional balance. Furthermore, a strong association was noted between sucrose preference and obesity, which is in agreement with Burke *et al.* (2018) [2]. Their study in mice demonstrated that high sucrose diets, particularly in liquid form, led to increased body fat, weight gain, and higher liver acylglycerol levels, indicating conversion of excess carbohydrates into stored fat.

The study also revealed that owners of obese dogs were significantly more likely to underestimate their pet's weight compared to owners of normal-weight dogs. This finding supports Courcier *et al.* (2009) [3], who observed that

approximately 75 per cent of owners with overweight dogs failed to recognize their pets' excess weight. No significant association was observed between canine BMI and the physical activity levels of owners. This is partly consistent with German *et al.* (2017), who found that overweight dogs were walked less often and for shorter periods, suggesting that owner behaviour may indirectly affect canine obesity. Similarly, no significant relationship was observed between the BMI of dogs and their owners' BMI (Table 6), in line with Robertson (1999) [15], who noted that animals with independent access to outdoor activity are less dependent on owners for exercise and feeding.

In conclusion, the HRQoL assessment demonstrated clear differences between obese and normal-weight dogs. Obese dogs exhibited greater food-seeking behaviour and higher pain scores, along with lower vitality scores. They also consumed more treats and preferred sucrose-rich diets. In contrast, owner-related factors such as BMI, physical activity, or employment status showed no significant association with canine obesity. These findings emphasize the importance of educating pet owners about the adverse effects of obesity, which not only shortens lifespan but also reduces overall quality of life. Promoting awareness and preventive strategies is therefore crucial for maintaining optimal health and well-being in dogs.

Conflict of Interest

Not available

Financial Support

Not available

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