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Obesity in pets: A mini review

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Abstract
Obesity is considered as an important unavoidable disease of public health concern. It is considered as a major problem in many parts of the world as the availability of food is generally abundant and overeating is common. Obesity can affect human as well as all types of pets. Obesity in pets can be defined as an excessive accumulation of fat in the body tissues, to such an extent that the animal's body weight is at least 20% greater than its optimal body weight. Such pets may develop serious health problems like osteoarthritis, heart diseases, diabetes, respiratory problems, high blood pressure, and cardiovascular disease. Prevention of obesity in pets is crucial for preventing the diseases associated with obesity. This review aims to convey an idea about the aetiology of obesity and its management in pets which helps in preventing obesity and its associated diseases to some extent.

Keywords: Obesity, dogs, cats, body condition score

Introduction
During the last two decades the prevalence of obesity has increased dramatically in both developed and developing countries. It is common in many countries like United States, United Kingdom, Australia etc. In the United States, 23-41% of dogs are overweight, and about 5.1% are obese (Lund 2006) [1]. The rate of obesity in cats was slightly higher at 6.4% (Lund 2006) [1]. In Australia, the rate of obesity among dogs in a veterinary setting was found to be 7.6% (McGreevy, 2005) [2]. Obesity becomes more than doubled in the USA and UK (Flegal 2002; Dutch Health Council 2003) [3, 4]. This trend is upsetting as obesity contribute to the aetiology of many serious illnesses like type 2 diabetes mellitus, hypertension, hyperlipidaemia, CVD, many types of cancer, gallbladder diseases and several musculoskeletal diseases (Dutch Health Council 2003; WHO 2000) [4, 5]. In the UK, the Pet owners have been prosecuted for cruelty to animals due to their pets being dangerously obese (Boden 2017) [6]. In the US, National Pet Obesity Awareness Day, is celebrated on the 14th of October (Shaw 2012; Chion 2012) [7, 8].

Obesity is a major common problem in many parts of the world among pets nowadays. Obesity in pets can be defined as an excessive accumulation of fat, to such a level that it undesirably affects health. An animal is considered obese when its body weight is at least 20% more than its optimal body weight (Linder and Mueller 2014) [9]. It can also shorten the life span of pet animals, other than impacting their overall health. Obesity is often associated with metabolic and hormonal changes, and can predispose pets to serious health problems like osteoarthritis, heart diseases, diabetes, respiratory problems, high blood pressure, and cardiovascular disease (Zoran 2010; Chandler *et al.* 2017; Howe 2015) [10, 11, 12].

To mitigate this, it is important to know in detail about the causes of obesity. And also, the involvement of any interacting genetic and environmental factors if present (Maes *et al.* 1997; Hill and Melanson 1999) [13, 14]. Genetic factors are predominantly irreversible and have been reported to explain 50–90 % of the variance in BMI (Maes *et al.* 1997) [13] and environmental factors are potentially reversible that are helpful in prevention and treatment of obesity. A few researchers have reported that the day by day increasing prevalence of obesity is due to changes in environmental factors as the human gene pool cannot have altered drastically (Linder and Mueller 2014; Hewitt 1997) [9, 15]. However, the exact effect of the environmental factor on obesity has not been quantified properly.

There is no genetic relationship between the pets and their owners however, pets are dependent on their owners' attitudes and behaviour for their food and lifestyle.

The relationship between the weight of pets and their owners provides information about the effect of individual attitudes and behaviour on body weight. There is a relationship between obesity in pet dogs and the degree of obesity in their owners (Mason 1970; Kienzle *et al.* 1998; Colliard *et al.* 2006) [16, 17, 18]. However, there is no similar correlation between cats and their owners (Nijland 2003) [19].

Causes

Obesity occurs when there is excessive dietary intake but energy utilization is comparatively less *i.e.*, when an animal is in a positive energy balance (Case 2011) [20]. Middle-aged dogs and cats, especially those aged between 5 -10 years are reported to be at an increased risk of obesity (Tilley and Smith 2015) [21]. The energy requirement in cats decreases from 2 years of age to approximately 11.5 years of age. If the calories intake in this animal are not reduced than the animal's energy requirements, then obesity occurs (Laflamme 2005) [22].

It can affect all kinds of pets and the most common causes are over-feeding and lack of physical exercise, (German 2006) [23] although certain diseases like hypothyroidism and insulinoma can also cause obesity in pets. Owners may consider food as a way to reward and treat their pets, which contributes to overfeeding which may lead to obesity. Pets confined to a house or small yard and which are not regularly exercised are more prone to obesity (Larsen and Villaverde 2016) [24].

The most important reason for obesity in pets is the lifestyle of the pet owner, excessive consumption of commercial food along with an unbalanced feeding schedule. Pet should be always provided with natural food by their owner. Dr Gustavo Pinto, a veterinary doctor from Panjim, Goa, said “Other than that, old pets and the pets who are not doing well emotionally also tend to suffer from obesity,”.

The risk of obesity in dogs (but not in cats) can be related to whether or not their owners are obese. The main factor seems to be the owner’s lifestyle and also obese owners are less likely to take their dogs on regular walking (Nijland 2009) [25].

In cats, neutering causes alteration in sex hormones which in turn lowers the basal metabolic rate, thereby increases the risk of obesity. Another reason of Obesity in neutered cats may be due to their reduced inclination to roam compared to non-neutered cats (Rand 2007) [26].

Diagnosis

Body condition scoring (BCS) methods are the most commonly used ways of diagnosing obesity in Veterinary practice. It measures relative body fatness and also serves as a reliable tool for assessing body composition. A 9-point body condition score (BCS) system is used in dogs and cats to identify whether they are above their ideal weight status (Laflamme 1997) [27]. BCS of 1-3 specify 'too thin'; 4 and 5 are 'ideal'; 6 is 'above ideal'; 7 is 'overweight'; and 8 and 9 are 'obese'. Numerous versions of the BCS chart are available like 5-point and 7-point versions etc., but, the 9-point chart is the only version that compare with true body fat percentage measured using dual-energy X-ray absorptiometry (DEXA) scans (Mawby *et al.* 2004) [28].

Body condition score is assigned to a pet on the basis of visual assessment and palpation of the animal to determine fat padding. An ideally conditioned dog should have a tapered waist when viewed from above and a clear abdominal tuck when viewed from the side. Ribs should not be visible but it should be easily palpable with only a very thin layer of fat cover (Laflamme 1997) [27]. An ideally conditioned cats will have a waist that can be observed behind their ribs, a slight fat pad over their ribs, and a minimal abdominal fat pad with no abdominal tuck (WSAVA 2023) [29].

These BCS methods are the most commonly used method but are not as accurate as performing DEXA scans that measure true body fat percentage. Body Condition Scoring is quick, non-invasive technique of measuring obesity that requires no specialist equipment, just the scoring charts and a clinician. Similar systems exist for livestock (Animal Health and Welfare) [30] and there is another scoring system available for horses called Henneke horse body condition scoring system.

Measuring body weight alone is not considered as a reliable tool for diagnosing obesity in pets. Because body weight may vary from species to species and also individual variation is there within a species and within a species, breed can vary significantly in their size. Weighing is still useful for monitoring changes and a gain in weight may be an indication of excess weight and should prompt assessing BCS. Puppy Growth Charts are available for dogs under 1 year of age where weights can be checked in relation to an average growth curve which in turn helps to monitor whether weight is increasing more than expected and deviating from the average growth curve should prompt assessing BCS (Waltham) [31].

Management

Weight can be managed in two steps *i.e.*, weight loss and weight maintenance. In the weight loss phase, energy intake from the food consumed must be less than the energy utilized each day. Losing weight in cats and dogs is challenging, and failure to lose weight is very common **(**Kienzle *et al.* 1998) [17]. If the animals themselves cannot control their own calorie intake, it is recommended that pet owners should control the Pet from excessive food consumption. Guidelines exist on energy allowances for animals as per body weight (Colliard *et al.* 2006) [18].

Medical treatments have been developed to assist dogs in losing weight. Dirlotapide (Brand name Slentrol) and mitratapide (Brand name Yarvitan) were authorized for use in the EU by the European Medicines Agency for helping weight loss in dogs, by reducing appetite and food intake, but both of these drugs have been withdrawn from the market in the EU **(**Kienzle *et al.* 1998) [17]. The US Food and Drug Administration approved dirlotapide in 2007 (Nijland 2003) [19]. Up to 20% of dogs treated with either dirlotapide or mitratapide experience vomiting and diarrhea; less commonly, loss of appetite may occur (Case 2011) [20]. When these drugs are stopped, the dog's appetite returns to previous levels. If other weight-loss strategies are not employed, the dog will again gain weight (Case 2011) [20].

Outcomes

Obese dogs and cats Compared to non-obese animals, have a higher incidence of osteoarthritis (joint disease) and diabetes mellitus, which also occur earlier in the life of the animal (Lund 2006) [1]. Obese dogs are more likely to develop urinary incontinence, may have difficulty in breathing, and are also likely to develop hypertension, hyperlipidaemia, cardio-vascular diseases, many types of cancer, gallbladder diseases and several musculoskeletal diseases. Obese animals are also at increased risk of complications following anaesthesia or surgery (Lund 2006) [1]. Obese dogs have a poorer quality of life compared to non-obese dogs as

(Kienzle *et al.* 1998) [17], well as having a lower life expectancy (Lund 2006) [1] compared to healthy dogs.
Obese cats have an increased risk of diseases affecting the mouth and urinary tract. **(**Kienzle *et al.* 1998) [17]. Obese cats which have difficulty in grooming themselves which predisposed to dry, flaky skin and feline acne (Tilley and Smith 2015) [21].

Conclusion
Obesity is nowadays considered as the most common nutritional disease of pets. From this review, it can be concluded that the weight of dog owners is correlated to the weight of their pet dogs. Taking a dog regularly for walk might be an effective way to prevent overweight in both the owner and the dog. However, further study on obesity in pets is required to firmly assess the relationship between length and frequency of walking and overweight status in owners and dogs. A proper diet with proper feeding schedule, regular walking and happy environment is considered necessary to prevent Obesity. Every pet owner also should take proper care of their lifestyle in order prevent their own obesity and as well obesity in their pets to some extent.

Conflict of Interest
The authors declare no conflict of interest

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