STUDY ON THE INFLUENCE OF EXOGENOUS AND ENDOGENOUS PREDISPOSING FACTORS REGARDING EXCESS WEIGHT IN A POPULATION OF DOGS

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Abstract

Obesity or overweight can have as starting points endogenous predisposing factors such as breed, age, sex, reproductive status and exogenous factors such as external influences appearing in food consumption, environment and lifestyle of the pet. The current study focuses on the monitoring of overweight dogs that are brought for a medical consultation in veterinary clinics, they have a body score above what is considered to be "ideal" - 5. The practical methods used in the research to find out the medical and dietary history of the patients were anamnesis and nutritional consultation, methods that also help owners of overweight animals to raise awareness of the problem. On these basis, a nutritional program aimed at combating the excess weight of dogs is created by: correcting the diet, intensifying the physical activity that the animal does and by streamlining communication with the owners of overweight animals.

Key words: *obesity, predisposing factors, dogs, nutritional program*

INTRODUCTION

Experts in the field of nutrition and veterinary medicine state that obesity is the most commonly diagnosed nutritional and metabolic disease in dogs. Obesity is defined as an excessive accumulation of fatty tissue leading to the development of serious health conditions (Delaney, 2010).

Studies conducted over the years show that excess weight is an emerging health problem in purebred dogs (Domínguez, 2011).

Overweight or obesity occurs as a result of an energy imbalance, on the one side the positive energy balance is maintained for long periods of time and the energy consumption is not high enough to compensate for the accumulated energy (Diez, 2002; Domínguez, 2011).

The current study followed the onset of a nutritional program designed for overweight dogs, which required changing the type or types of food precisely in order to improve the diet and therefore the lifestyle of the patient.

MATERIAL AND METHOD

To estimate the prevalence of obesity and/or overweight, a descriptive study was used to follow the parameters - size, sex, reproductive status, breed, age, as well as an analysis of the quantitative intake of food (dry, wet, home-made) provided by the owner - of a dog population of 26 individuals from November 2020 to June 2022 presented in Table 1.

Within the study dog patients were divided by sex, females are in the first part of Table 1, followed by males. After a first sorting, a gender distribution by size follows, from large to small dogs

Monitoring of patients required establishment of body score prior to the start of the diet, regular weighing of dogs during the weight loss program, with dogs being weighed every 2 weeks or monthly (depending also on the owners' ability to bring the dog to the veterinary clinic).

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Table 1 Characterization of the group of dogs under study

Nr. Crt.	Name	Size	Sex	Reproductive status	Breed	Age (years)
1	ZIGGY	Large	Female	Neutered	Labrador Retriever	11
2	BELLA	Large	Female	Neutered	Labrador Retriever	3
3	BELLA*	Large	Female	Neutered	Labrador Retriever	12
4	ZENY	Large	Female	Neutered	Labrador Retriever	2
5	INDY	Medium	Female	Neutered	Mixed breed	7
6	KIKI	Medium	Female	Neutered	Mixed breed with Labrador	9
7	BETY	Medium	Female	Neutered	Beagle	8
8	FOXIE	Medium	Female	Neutered	Mixed breed	2
9	NEGRUȚA	Small	Female	Neutered	Mixed breed	9
10	LIZUCA	Small	Female	Neutered	Mixed breed	5
11	CORA	Small	Female	Neutered	Pinscher pitic	13
12	JIMINA	Small	Female	Neutered	Yorkshire Terrier	2
13	PUGGY	Small	Female	Intact	Pug	4
14	OLI	Large	Male	Neutered	Labrador Retriever	7
15	BENI	Large	Male	Intact	Viszla	11
16	ALFIE	Large	Male	Neutered	Labrador Retriever	2
17	DANTE	Large	Male	Neutered	Rottweiler	6
18	TOTO	Large	Male	Intact	Labrador Retriever	9
19	TAZ	Medium	Male	Intact	Border Collie	3
20	BERNIE	Medium	Male	Neutered	Mixed breed	9
21	FIDO	Medium	Male	Neutered	Mixed breed	5
22	HAPPY	Medium	Male	Neutered	Beagle	8
23	JACK	Medium	Male	Neutered	Mixed breed with Labrador	5
24	BOBO	Small	Male	Neutered	Bichon Maltese	10
25	PATRICK	Small	Male	Neutered	Chihuahua	9
26	DIXY	Small	Male	Intact	Yorkshire Terrier	8

In order to establish an individual diet plan, medical information and the dog's nutritional history were correlated, so the type of food, the type of treats offered in a day, the number of meals per day and the exercise time were determined. Diet changes and dog weights were also recorded in a veterinary medical software.

RESULTS AND DISCUSSIONS

In the case of the research conducted between November 2020 and June 2022, increased or slightly increased percentages are shown for breeds such as Labrador Retrievers, Beagles and Labrador mixed breeds, which are prone to obesity. According to Figure 1, out of 26 dogs observed, 27% (approximately) were Labrador, 8% were Beagles, equal numbers are Labrador mixed breeds and 23% are mixed breeds (individuals from two different and unknown breeds).

Tables 2 and 3 show the breeds of dogs and associated mixed breeds encountered during the practical research, these have been divided by sex, in Table 2 the females are shown and in Table 3 the males.

Table 2 Female dog Breed ideal weight chart compared to patients weight

Breeds and associated mixed breeds	Female weight (kg) A.K.C. 2017	Pacient name	Initial weight (kg)	Weight after diet (kg)	Weight evolution percentage
Beagles (height – 38 cm)	9.0–13.5	BETY	18	16,9	-6.1%
English Springer (mixed breed)	18.1	INDY	27	24.2	-10.3%
Labrador Retrievers	24.9 – 31.7	ZIGGY	40.7	33.6	-17.4%
		BELLA	39	38.3	-1.7%
		BELLA*	44.1	38.8	-12.0%
		ZENY	52	45.1	-13.2%
Labrador Retrievers (Welsh Corgi mix)	11.3 - 15.4	KIKI	25	20.4	-18.4%
		FOXIE	16	16	0.0%
Miniature Pinchers	3.6 – 4.5	CORA	8.8	8	-9.0%
Pekingese (mixed breed)	<6.3	NEGRUȚA	8.5	7.6	-10.5%
		LIZUCA	9.1	8.1	-10.9%
Pugs	6.3 – 8.1	PUGGY	9.6	8.7	-9.3%
Yorkshire Terriers	<3.1	JIMINA	7.7	6.9	-10.3%

Table 3 Male dog Breed ideal weight chart compared to patients weight

Breeds and associated mixed breeds	Male weight (kg) A.K.C 2017	Pacient name	Initial weight (kg)	Weight after diet (kg)	Weight evolution percentage
Beagles (height – 38 cm)	9.0–13.5	HAPPY	24.5	24	-2.0%
Bischon Frises	5.4 – 8.1	BOBO	11.5	9.1	-20.8%
Border Collies	13.6 - 24.9	TAZ	26.3	25.7	-2.2%
Chihuahuas	<2.7	PATRICK	5	4.5	-10.0%
English Springer (mixed breed)	22.6	FIDO	30.9	31.9	+3.2%
Labrador Retrievers	29.4 – 36.2	OLI	55	48	-12.7%
		ALFIE	39	35	-10.2%
		TOTO	53.4	52.5	-1.6%
Labrador Retrievers (Welsh Corgi mix)	13.6 - 17.2	JACK	18.5	17.3	-6.4%
Rottweilers	43 – 61.2	DANTE	63	60	-4.7%
Siberian Huskies (mixed breed)	20.4 - 27.2	BERNIE	39	28	-28.2%
Viszlas	24.9 – 27.2	BENI	42.6	41.1	-3.5%
Yorkshire Terriers	<3.1	DIXY	8.1	6.9	-14.8%

Also to highlight the central issue of the study - overweight - the patients' initial weights were compared with the ideal, official weights provided by the American Kennel Club (AKC, 2017). The two tables showed the weights of the patients after the weight loss programme and the proportion of weight loss, percentages ranging from 1.6% to 28.2%, and an isolated case of weight gain of 3.2% due to non-compliance with the recommended diet.

Out of the 26 overweight dogs that were brought to the veterinary clinic, 13 of them were male and 13 were female, the percentage being 50% in favour of each sex as shown in Figure 2. Scientists have asserted that ovariohysterectomy in females and orhidectomy in males, surgeries that involve the removal of sexual glands in females and males, can increase the risk of obesity in both sexes (Robertson, 2003).
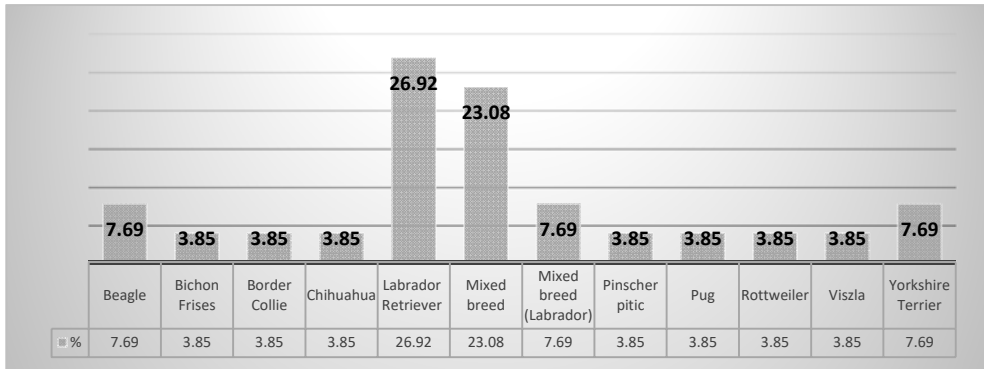
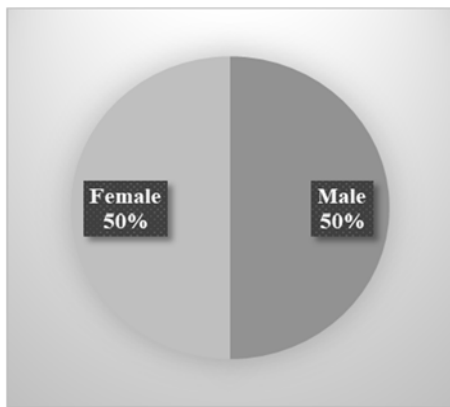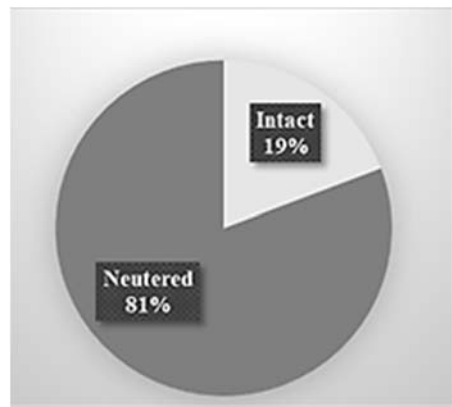|	Beagle	Bichon Frises	Border Collie	Chihuahua	Labrador Retriever	Mixed breed	Mixed breed (Labrador)	Pinscher pitic	Pug	Rottweiler	Viszla	Yorkshire Terrier
%	7.69	3.85	3.85	3.85	26.92	23.08	7.69	3.85	3.85	3.85	3.85	7.69

Fig. 1 Percentage of overweight dogs by breed

Fig. 2 Percentage of overweight dogs by sex

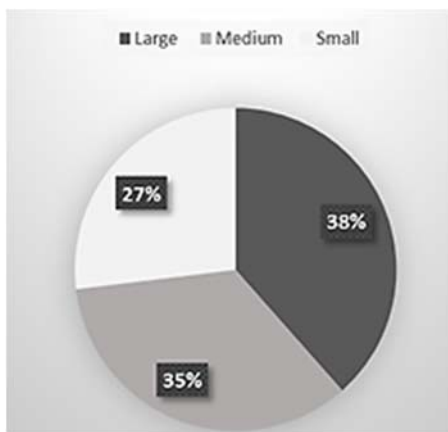Fig. 3 Percentage of overweight dogs by hormonal status
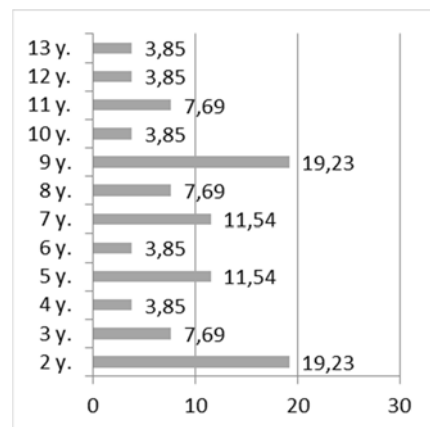
Fig. 4 Percentage of overweight dogs by size

Fig. 5 Percentage of overweight dogs by age (y-years

Table 4. Food history - analysis and quantitative intake of food given by owners to the dogs under study

Nr Crt	Name/body weight		Food provided by the owners	Quantity (approximated by owners)			ME/ energy (Kcal)	Recommended diet	Recommended quantity of food (grams)	ME/ energy (Kcal)
	Name	BW (kg)		Dry food (grams)	Wet food (grams)	Home-made food (g)				
1.	Beni	42,6	Pedigree	700	-	-	2520	Hill's P.D. weight reduction r/d	320	1050
2.	Indy	27	Bozita Robur sensitive with reindeer	400	-	-	1496	Hill's P.D. weight reduction r/d	215	711
3.	Fido	30,9	Bozita Robur sensitive with reindeer	500	-	-	1870	Brit Care Weight Loss Rabbit & Rice	240	782
4.	Kiki	25	Procan Prestigio Mix	400	-	-	1400	Brit Care Weight Loss Rabbit & Rice	200	662
5.	Ziggy	40,7	Canagan with salmon + h-m. food	350	-	300	1678	Brit Care Weight Loss Rabbit & Rice	256	847
6.	Oli	55	Brit Care Sensitive + Brit canned	500	200	-	2040	Brit care- Senior Lamb and Rice	355	1236
7.	Bernie	39	Procan prestigio Mix Adult	600	-	-	2100	Brit Care Weight Loss Rabbit & Rice	271	897
8.	Cora	8,8	Brit weight loss + Solo can+ h-m. food	40	100	150	393	Brit Care Weight Loss Rabbit & Rice +h-m.food	187	266
9.	Bobo	11,5	Special Dog+Cezar	150	25	-	547	Brit Care Weight Loss Rabbit & Rice	348	105
10.	Negruța	8,5	Brit Care Adult Salmon and potatoes	100	200	-	572	Brit Care Weight Loss Rabbit & Rice	85	285
11.	Lizuca	9,1	Brit Care Adult Salmon and potatoes	100	200	-	572	Brit Care Weight Loss Rabbit & Rice	85	285
12.	Bety	18	Darling	600	-	-	1866	Brit Care Weight Loss Rabbit & Rice	170	533
13.	Patrick	5	Hills, Royal, Purina +1 chicken pulp, boiled	100	-	100	515	Royal Canin Gastrointestinal low fat	60	216
14.	Happy	24,5	Bosch lamb and rice	400	-	-	1440	Hills c/d 50% + Hills r/d 50%	190	662
15.	Alfie	39	Dr John GOLD	500	-	-	1850	Brit Care Weight Loss Rabbit & Rice	271	897
16.	Bella	39	Friskies adult	900	400	-	2610	Brit Care Weight Loss Rabbit & Rice	305	1007
17.	Dixy	8,1	Pedigree	150	100	-	621	Brit Care Weight Loss Rabbit & Rice	95	305
18.	Zeny	52	Brit premium light	700	-	-	1900	Brit Care Weight Loss Rabbit & Rice	390	1256
19.	Bella*	44,1	Frieskies +Skipper	300	400	-	1500	Brit Care Weight Loss Rabbit & Rice	320	1071
20.	Jack	18,5	Brit premium by nature M	500	-	-	1850	Hill's P.D. weight reduction r/d	170	540
21.	Dante	63	RC Rottweiler + Nuevo can + h-m. food	400	400	400	2370	Royal Canin Rottweiler	435	1555
22.	Jimina	7,7	Perfect fit	250	-	-	988	Hill's P.D. I/d low fat	86	284
23.	Puggy	9,6	Pedigree + Pedigree can	150	200	-	700	Royal Canin Gastroinstestinal + h-m. food	190	352
24.	Toto	53,4	Insect dog Hyppoalergen	600	-	-	2116	Insect dog Hyppoalergen	360	1270
25.	Taz	26,3	Brit adult +Carnilove	500	-	-	1912	Brit Care Weight Loss Rabbit & Rice	200	662
26.	Foxie	16	Pedigree	100	250	-	563	Brit Care Vet. Diet Obesity	140	452

In the study carried out between November 2020 and June 2022, out of the total of 26 dogs that were brought to the clinic with weight problems 81% were neutered while only 19% were intact (sex glands not removed) as shown in Figure 3.

In the case of dogs, another parameter has been studied that can complete the information on factors that can predispose a species to obesity. Therefore dogs were classified according to body size and literature (depending on breed) into 3 categories of "small", "medium" and "large", with a higher incidence of obesity in large dogs (Labrador Retrievers were included here), and a decrease in medium dogs from 38% to 34%, with small dogs being the least affected by excess weight - 27% according to Figure 4. In the literature, a 70% increase in the frequency of obesity has been observed in dog populations aged 9 years and older (Meyer, 1978), and more recent studies reaffirm this hypothesis by stating that patients - dogs over 10 years are more likely to be overweight than all age groups under 5 years (Mankowska, 2016).

Research carried out in the clinic revealed a predisposition of 2-year-old dogs to obesity on a par with 9-year-old dogs in 19% of the cases investigated as shown in Figure 5.

The study of the dog population by age group also shows a preponderance of obesity cases in the young age group 11 individuals aged 2 to 6 years as well as individuals aged 7 to 10 years, while only 4 senior dogs were diagnosed with obesity.

The initial aim of the nutritional consultation carried out in the veterinary clinic was, in addition to the medical history, to find out the dietary history of each patient. The nutritional consultation form includes questions such as "What type of food is your dog currently receiving? (home-cooked food and/or dry food-brand/wet food-brand)" owners should name each type of food they are feeding their pet, including whether they are also receiving table scraps. The owner is also asked for details of the amount of food given in a day as part of the nutritional consultation.

In order to clarify and minimise the risk of misinformation being given, an additional question has been added to the question about the amount of food given, namely "how many times a day?", as the owner often fails to indicate the number of portions given to the dog in a day. The amount of food is approximated as follows: "a bowl of food twice a day" or "a handful of kibble(dry food) three times a day", which is why concrete approximations are required.

For the type of dry feed the owner is asked to approximate in grams of dry feed/day or grams of dry feed/serving. For the wet feed type the quantity is easier to calculate as wet feed is often found in 100g pouches or 400g, 800g and even 1200g cans. Dog owners also want to give their pet home cooked food and therefore, as shown in Table 3, the portion of cooked food has also been calculated.

Often it is impossible to approximate the amount of food because the food is served "ad libitum" - which increases the risk of weight gain. Therefore a first step in realising the importance of a nutritional consultation by pet owners is precisely the awareness that the pet has a weight problem and that the current diet is inadequate.

CONCLUSIONS

Among the factors found throughout the research that can predispose dogs to obesity or weight gain, the following were highlighted: excess food and/or calorically inadequate food provided by owners, along with an exaggerated number of treats or leftovers from the family meal.

In this way, an attempt was made to remediate overweight in the dogs studied by choosing specialized veterinary (therapeutic) diets with a low energy value, and the amount of food was calculated according to the individual energy requirements of the patients.

At the end of the nutritional programme period, a reduction of the initial weight by 1.6% to 28.2% was observed, but also an isolated case of weight gain, having as causes: incorrect application of the diet or a non-cooperation of the owner.

ACKNOWLEDGEMENTS

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