The Obesity Epidemic in Humans and Canines
Targeting Obesity with “Fit With My K9” Facebook Group

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Summary: The prevalence of obesity has dramatically risen over the last decade in humans and dogs alike. Obesity can exacerbate other health conditions such as type 2 diabetes, hyperlipidemia, hypertension and heart disease making it imperative for the obesity epidemic to be addressed in both species. Although obesity can be treated through diet and exercise management, many have difficulty sticking to a weight loss regimen. As a management tool, a user run Facebook group “Fit With My K9” is presented that allows users to exercise with each other and their pets, share useful information, and upload photos. The goal of the group is to motivate individuals to exercise more with their pets and others, in order to decrease the prevalence of obesity.

Video Link: https://www.youtube.com/watch?v=t-mhtkgdeHM
Facebook Group: https://www.facebook.com/groups/153368943190/

The Issue: The Obesity Epidemic in Canines and Humans
Obesity is a growing concern for humans and companion pets (1). Currently around two thirds of adults in the United States are obese or overweight (2). Studies from various parts of the world indicate that the obesity prevalence in dogs is between 22 and 40% (3). The disease is due to a positive energy balance (2); weight gain is caused by prolonged positive energy balance. Obesity increases the likelihood of other diseases: hyperlipidemia, type 2 diabetes mellitus, hypertension and cardiovascular diseases (4). Additionally, obesity causes social prejudice. There is a stigma that develops towards overweight individuals. Obese individuals are usually perceived as lazy, unmotivated and lacking self discipline. Stigmas associated with obesity have shown to negatively affect individuals in the work place, health care settings, educational settings and interpersonal relationships (5). Therefore, it is evident that obesity has a significant negative impact on the emotional and physical well being of an individual. Doing something about it is the hard part.

Environmental Factors in Canines
Environmental factors are significant contributors to obesity that affect both dogs and humans (6). Major environmental factors affecting canine obesity include, but are not limited to, the amount of weekly exercise, the rate at which treats are given and neutering (7). As suspected, there is a negative correlation between obesity and exercise. An increase in exercise increases canine energy expenditure, thus minimizing positive energy balance. In other words, dogs classified as obese exercised a lot less than non-obese dogs. Feeding frequency was investigated by feeding dogs once a day, twice a day and several times per day which had an obesity prevalence of 37%, 47% and 49%, respectively (8). The results of the study indicate that feeding a dog multiple times throughout the day drastically increases their likelihood of obesity.
Nevertheless, feeding a dog once a day does not necessarily guarantee that the dog will avoid weight gain. It is important to note that the quality of food also affects the net energy balance of a canine. The type of food fed dogs, specifically commercial versus non-commercial, has also shown to affect weight gain in dogs. The obesity rate of commercial dog food (37%) was significantly lower than that of animals fed a non-commercial one (48%). Therefore, the study found that diet was also an important factor in weight gain in canines (9). The results of the study are explained by the notion that non-commercial food includes human food, such as table scraps, which usually have a high caloric content and saturated fatty acid concentration. On the contrary, commercial food made specifically for dogs are of high quality, and fulfill all the nutritional needs of dogs. Lastly, neutering animals was another factor that has a positive correlation with obesity (10). An increased risk of obesity in neutered animals is perhaps due to a decline in metabolic rate, alterations in feeding behaviors and decreased physical activity. From reviewing these studies, it makes sense that owners should start feeding their dogs only commercial food, as well as including some physical exercise in their daily routine. Such recommendations could greatly improve the longevity of canines and minimize the diseases/conditions associated with obesity.

**Environmental Factors in Humans**

Environmental factors also predispose humans to obesity and its comorbidities (heart disease, diabetes, etc.). Recent studies on human subjects indicate that the obesity epidemic is due to high energy/high fat diets, fast food consumption, and lack of exercise (11). Specifically, a positive net energy balance in humans is largely due to our diet and exercise habits. This is probably since our society has shifted to a productive, fast paced environment where we see a benefit in consuming cheap, convenient fast food. However, such habits have led to the rise of the Western diet, a major culprit of the obesity epidemic in the United States. The Western diet is comprised of foods containing too little fiber, too few micronutrients, too many trans-fats, too much fructose (12). An absence of fiber causes a rise in blood glucose levels, thus promoting fat storage. Furthermore, individuals are not consuming enough omega-3 fatty acids, found in fish, flax and seed oils, which prevent obesity and adipose tissue inflammation (13,14). Studies have also shown that obese individuals have high levels of micronutrients deficiencies, such as vitamins and minerals (15). The results would suggest that supplementing or including diets with high amounts of micronutrients would prevent obesity. Additionally, an increase in trans-fat intake induces obesity and insulin sensitivity in individuals (16). Trans-fats are hydrogenated unsaturated fatty acids that contain trans double bonds. Trans bonds in fats are abnormal, as majority found in nature are cis bonds. The results of studies linking obesity and trans-fats have led the FDA to ban products containing trans fats (17). Lastly, a major component predisposing individuals to obesity is high amount of fructose in diets. Sucrose consumption, or table salt, is a prevalent sweetener in many naturally occurring foods. There is a strong positive correlation between sucrose intake and obesity. However, it is important to note that not all sugar is bad. Studies have found that sugar intake in foods with low fiber causes a greater risk of obesity than low sugar with high fiber (18). For example, drinking a soda or eating an apple have around the same amount of carbohydrates. Nevertheless, a soda has no fiber so it causes an insulin spike, thus triggering the liver to store food intake as fat. The cumulative results from these studies indicate that a Western diet predisposes an individual to obesity and that changes in diet would help reduce the prevalence of obesity.
Nevertheless, it is important to note that a net gain of energy is the underlying cause of obesity and weight gain. Energy balance is when energy in equals energy out. Food and drink intake is only the intake of energy. Energy expenditure is the energy used for breathing, digestion and being physically active. Therefore, overweight and obesity happen over time when you consume more calories than you use (19). An inactive lifestyle in our society is due to many people spending too much time sitting in front of a TV or their computers doing work, schoolwork and leisure activities (18). Overweight and obese patients could benefit from exercise, thus minimizing the net gain of energy. Overweight individuals would see immediate benefits following short-term interventions (<6 months of duration) interventions consisting of exercise combined with a healthy diet and proper guidance (20). Physical activity recommendations for adults and children range from 30 to 60 minutes aerobic and resistance training on most days of the week (21). Training sessions should include the warm up, conditioning phase, and cool down. Notably, resistance training does not seem to promote weight loss; rather, resistance training increase fat-free mass and increases the loss of fat mass (22). Therefore, it is recommended to utilize both aerobic and resistance training to reduce obesity and its comorbidities.

From analyzing both the environmental effects of dogs and humans, we can observe that there are similarities between the environmental factors predisposing both groups to obesity. On one hand, dogs cannot control their diet and exercise regimen as this is determined by the owner. On the other hand, humans have the willpower and resources to change their lifestyle and their pet’s Therefore, a key player in reducing the obesity epidemic, in dogs and humans, would be to increase the owner’s personal value of living a healthy, disease-free lifestyle. Such changes in the mindset and attitude of a pet owner would pave the way to reducing the prevalence of obesity in both dogs and humans.

Genetic Factors in Humans
In addition to environmental factors, genetic factors must also be considered. Heritability studies between monozygotic and dizygotic twins suggest that there is a 73% heritability of obesity (11). The high heritability constant suggests that obesity is under strong genetic influences. Currently, around 253 quantitative trait loci have been associated with obesity in 2 or more studies. However, only 22 gene associations have been supported by at least 5 positive studies (22). Many unconfirmed associations could be due to studied with small sample sizes or a lack of analysis into genetic variations. In humans, common genetic predispositions are members of leptin-melanocortin pathway, proinflammatory cytokines and uncoupling proteins, such as $MC4R$ and $FTO$ (23). Additionally, epigenetic marks also affect genetic expression. Imprinting could affect obesity, especially as a child is growing (24). For example, studies have shown that obese mothers tend to have obese children, and that clinical intervention to cause weight loss in the mother to prevent weight gain in the child (25). The evidence from the study indicated that epigenetic modifications during critical developmental periods affect gene expression in an organism. Epigenetic modifications include, but are not limited to, DNA methylation and histone modification. Nevertheless, epigenetic markings are still not fully understood and more research needs to be conducted (26). From analyzing the information we can observe that there is a strong genetic component in regard to genetic variations and imprinting which can predispose an individual to obesity.
Genetic Factors in Dogs
Likewise, dogs also have genetic predispositions to obesity. Cross-bred dogs are more likely to be obese than purebred (15). Additionally, certain species are more likely to become obese. Cocker Spaniels, Pekingese, Pomeranians and Golden retrievers breeds are more predisposed to obesity (16). However, it is important to note that it may be difficult to rank breed propensity as multiple external environmental factors have been shown to significantly affect breed risk as well. Genetic variations in dogs were studied in MC3R, MC4R, FTO and INSIG (17). It is important to note that both humans and dogs have genetic predispositions to MC4R and FTO. Unfortunately, only a few polymorphic reports on canines have been published. Thus, the dog is could be a useful model in studying human obesity pathology and treatment methods (25).

Community Action: Setting up a Facebook group page “Fit with my K9”
The community action plan is to create a Facebook group, “Fit with my K9” to address the obesity epidemic in dogs and humans. Our group has two goals: 1) to raise awareness about obesity and 2) to promote an interactive medium through which individuals can achieve weight loss. We hope that by creating "Fit with my K9" group, it will promote an interactive medium through which individuals can train together, share healthy recipes, ask for advice and so on. Facebook is the best social media to create our group due to its popularity. Majority of individuals are already subscribed on Facebook, so it is easy to join our group and navigate throughout the site, as users are familiar with the Facebook interface. Additionally, the Facebook group page has many interactive functions.

A big problem with the obesity epidemic is that diet and exercise regimens require a lot of individual willpower. Many individuals lack the motivation and incentive to follow through with such demands. "Fit with my K9" will allow individuals to collaborate and support each other towards the common weight loss goal. For example, a feature of the club is to have wagers between competitors. Competitors can stay motivated by challenging another individual to a challenge and wager of their choice. Wagers can include anything from a monetary value to taking someone out for coffee, or going to a movie or other event. Likewise, challenges can include anything from a race around town to seeing who lost the most weight. We believe that the competitive aspect of "Fit with my K9" will allow to participants to stay motivated as they work towards an incentive. Nevertheless, it is important to note that "Fit with my K9" is not liable for agreements in regards to challenges and wagers. Individuals are welcome to participate in challenges of their choice at their own risk. Nevertheless, "Fit with my K9" is not strictly based on competitions. People can use the group to stay motivated through a workout partner. The workout partner that they interact with could be across the country or around the corner. For example, individuals can find partners to go exercise with as a way to stay motivated. A partner could also be a pen pal across the country, where both parties email each other about their progress and success, as a source of motivation. Essentially, the goal of "Fit with my K9" is to act as an interactive medium where individuals have the freedom to interact, compete and collaborate with others in order to pursue a common weight loss goal.
Fit With My K9 will have multiple functions that are run by users. Users will have the access to post on the group home page. This feature will allow users to share information with one another and find workout partners. For example, one individual could post on the group that they are going to exercise and if anyone wants to join. Finding a workout partner would be helpful in motivating individuals towards weight loss and making new friends in the nearby area. Additionally, many people aspire to lose weight, but do not have access to the correct information. Therefore, the group can also serve as a useful educational tool. Users can post healthy recipes, workout guides, and fitness plans that other users will have access to. A plethora of information will allow users to have multiple options when it comes to weight loss. For example, users could be interested in activities varying from weightlifting to playing volleyball. Hopefully, the group will act as a way to meet all the varying needs of users. Lastly, users will have the option to create events. Events can be anything from a barbecue at someone’s house to holding a marathon. Essentially, the overall goal of the group is for individuals to motivate each other as they aspire towards a common goal.

Unfortunately, almost all advertising costs money. An attempt was made to share the group link on other Facebook group, but the posts ended up being reported as spam. Instead a brochure and a flier was made to promote the group. The purpose of the brochure is to print the document so it could be made available at pet shelters or veterinary offices. Additionally, information about Fit With My K9 was posted on www.dogforum.com and www.dogforums.com. Below are links to the brochure and flier:
Conclusion
Both genetic and environmental factors play a role in predisposing an individual to obesity (3). Studies have found that there is a high correlation between the degree of overweight of the dog and the BMI of the owner (7). The results suggest that the growing prevalence of obesity in humans and companion animals is most likely due to common environmental predispositions (5). Even though there are genetic predispositions in the two species, it is nearly impossible to change the genetic makeup or imprinting of an organism (6). Therefore, our project aim is to target environmental factors in order to minimize the prevalence of obesity in both humans and dogs. It is important to note that weight loss can still be achieved regardless of genetic predispositions. For example, a study has found that the correlation between the BMI of the dog and the owner disappeared after time spent walking; suggesting that the shared time spent walking determines the degree of overweight in the owner and companion pet (7). The studies findings indicate that targeting environmental factors such as exercise, diet, and lifestyle can have a positive impact on weight loss. Thus, our project hopes to establish and implement a weight loss program to target weight loss in both species. The project will be a Facebook page where individuals can post healthy recipes, challenge each other to weight loss competitions and participate in event activities. Challenges could include the pet with or without the pet owner with activities like walking, running, and swimming. The goal of the project is to promote health and reduce obesity in both the owner and dog, while strengthening the relationship and happiness of the participants.

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Letter to the Editor

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To the editor,

I’m writing to address the increasing obesity epidemic in humans and canines. The causes of obesity are well established: a high caloric intake paired with low exercise activity. Nevertheless, the prevalence of dog and human obesity continues to grow. Why is it that individuals spend a ton of money on weight loss programs, yet they do not experience positive results? The major problem with weight loss is that individuals and dogs are not well educated or motivated enough to lose weight properly.

“Fit with my K9” is a Facebook group created to address the obesity epidemic in both canines and their owners. The group allows individuals to compete against others and find workout partners, as a source of motivation. Additionally, the group will allow individuals to view healthy recipes, efficient workout plans and their weight loss progress.

I am a student at Rutgers University majoring in Biological Sciences. I have been working hard to prepare the group for launch. I urge you to contact your readers to join and participate in the group in order to take a step against obesity.

Sincerely,

Eugenia Saiegh