

## Abstract

Body condition scoring is intended as a standardized assessment of whether the animals are undernourished, over-nourished or have the optimum body weight based on a scale between 1 to 5 or 1 to 9, where 1 is emaciated and 5 or 9 as grossly overweight. This method requires palpation of the animals, wherein many veterinarians admit that assessing an animal's body condition score is rather subjective. Body condition Score (BCS) has been determined by physical examination of the pet. The body parts and region which have been subjected to assess body condition score are ribs, waist, abdomen, neck, limbs, lumbar vertebrae, pelvic bones, all bony prominences, thorax, spine, base of the tail, muscle mass. Body condition score (BCS) is a common method to evaluate the body fat mass in animals. By palpating and observing fats under the skin it is possible to predict animal's body fat accumulation condition. BCS is also a useful tool to estimate body fat composition in pet. It gives an idea of energy reserves in an animal body and estimated energy required to function the physiology of the body. The purpose of the study is to correlate the BCS of pet with some of the parameters associated with it like body weight, feeding amount, feeding frequency, watering amount, watering frequency, defecation frequency, urination frequency, sleeping area, roaming area, disease recovery time, exercise duration and exercise frequency. This study unearth that the parameters mentioned above affect body condition score more or less. Body condition score represents a pet's physical as well as mental health. This study indicate that about 17.5% pet animals are obese. It is suggested not to reach obesity rather maintain a BCS called "good". Overweight and obesity induce serious health problems that exert negative effects on pet's welfare. Nowadays one of the main complications of obesity found in pet animal (especially in cat) is diabetes mellitus. To prevent this disease a pet owner is suggested to maintain the standard body condition status by following a balanced diet as per requirement of nutrition considering the age, weight and activity of the pet.

**Keywords:** Body condition score (BCS), Health, Obesity, Overweight, Nutrition, Pet animal, Feeding, Watering.

## CHAPTER-I: INTRODUCTION

A pet is an animal kept primarily for an individual's company or entertainment instead of as working animal, livestock or a laboratory animal. Popular pets are often considered to have attractive appearances and relatable personalities. Pets provide their owners physical as well as emotional benefits. Human ownership of dogs as pets may date back to at least 12,000 years ago archaically (Davis and Valla, 1978). Throughout the seventeenth and eighteenth-century pet keeping gradually became accepted throughout Britain. As the popularity of pet-keeping is rose during the Victorian era, animals became a fixture within urban culture as commodities and ornamental objects. Pets gradually became the property of their owners. Pets gain the social and cultural value throughout the nineteenth century (Serpell, 2017).

According to the World Health Organization, health is "a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity." Body condition score is an indicator of health. To maintain the health, body condition score is essential. It helps to determine the amount of feed should be provided or reduced to balance the diet. Pet's health is also associated with owner's health. A healthy pet helps the owner by providing quality time, excitement and joy, reduce anxiety. As a results owners' mental condition remain sound.

Obesity is a condition in which an excess body fat has developed to the point that health is adversely affected. Epidemiologic surveys that have used BCS estimated that 25 to 30% of dogs and cats examined by veterinarians are carrying excess weight (BCS of 3.5 to 4.0 on a scale of 1.0 to 5.0) with about 5% being obese (BCS > 4.5) in USA (Burkholder, 2000). Overweight pets have a shortened life span, their quality of life is adversely affected, and they are predisposed to other unhealthy conditions. Proactive monitoring of body weight and body condition throughout life would be fundamental to any such preventive plan. Assessing body condition by assigning a Body Condition Score (BCS) is a subjective, semi-quantitative method of evaluating body fat and muscle which represents the health status as well as nutritional status of animals (Thompson *et al.*, 2019). Body condition is an indication of the energy reserves in an animal body (Beck *et al.*, 1993). It is associated with proper ration formulation for pet, prescribing perfect dose of drug by clinicians.

So the importance of Body condition score (BCS) is noteworthy for pet animal. Moreover, it is observed that the study with this topic is limited in Bangladesh. Therefore, this study was conducted to determine the overall health status of the domestic pet animals that were brought to the hospital for their wellbeing check as well as the overall management of the animals.

The objectives of this study was –

1. To observe the health status of the pets brought in the hospital.
2. To establish the standard body condition score for pet animals.
3. To observe the effects of feeding, exercise and diseases on body condition score.

## CHAPTER-II: MATERIALS AND METHODS

### Study area

The study is conducted at Teaching and Training Pet Hospital and Research Center, Purbachal, Dhaka (15 June to 29 June, 2021 and 06 October to 13 October, 2021), Central Veterinary Hospital, Dhaka (17 October to 26 October, 2021), different household at Mirpur DOHS (17 October to 26 October, 2021) during the internship placement.

### Preparation of questionnaire

Questionnaire is prepared including the demography (age, sex, breed, body weight etc.), body condition score, feeding history, housing system, vaccination, deworming and disease history, exercise status, production status to collect data from pet owners and recorded sheet of recognized institutions. The type of the questionnaire is of open-ended.

### Data collection

The data was obtained based on physical examination of the pet and through interviewing the pet owners. Body condition score was assessed by examination of ribs, waist, abdomen, neck, limbs, backbone as per published description (Sil *et al.*, 1995). Body Condition Score (BCS) is categorized into 5 types (Bjornvad *et al.*, 2011). The score is presented below in tabular form.

Table-1: Body Condition Score of pet animal.

Score 1	Ribs, lumber vertebrae, pelvic bones and all bony prominences evident from a distance. No discernible body fat. Obvious loss of muscle mass.
Score 3	Ribs easily palpated and may be visible with no palpable fat. Tops of lumber vertebrae visible. Pelvic bones becoming prominent. Obvious waist and abdominal tuck.
Score 5	Ribs palpable without excess fat covering. Waist observed behind ribs when viewed from above. Abdominal tucked up when viewed from side.
Score 7	Ribs palpable with difficulty; heavy fat cover. Noticeable fat deposits over lumbar area and base of tail. Waist absent or barely visible. Abdominal tuck may be present.
Score 9	Massive fat deposit over thorax, spine and base of the tail. Waist and abdominal tuck absent. Fat deposit on neck and limbs. Obvious abdominal distention.

### CHAPTER-III: RESULTS

The overall statistics of the pet are given in Table-2.

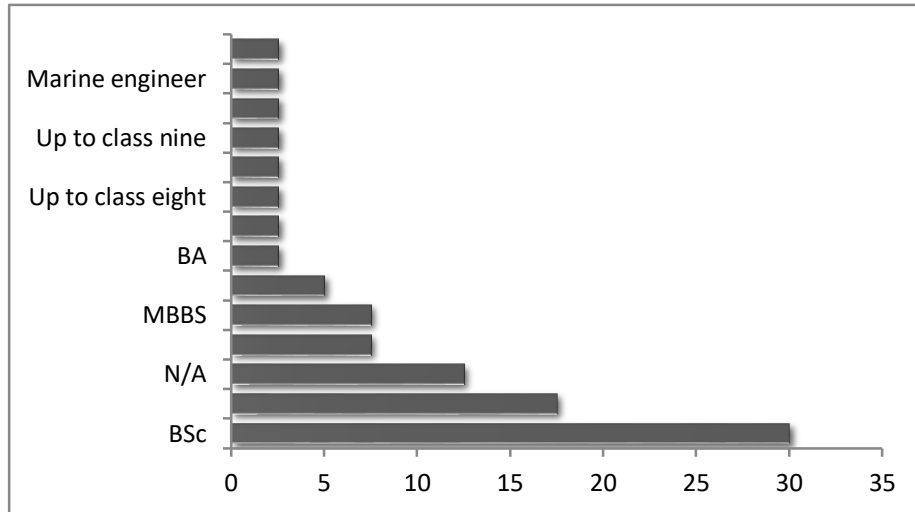
Table-2: Overall and individual statistics of the parameter associated with body condition status

Parameter	Overall statistics			Individual statistics			SE	Significance
	Min	Max	Mean	Cat	Dog	Rabbit		
No. of pets per owner	1	17	2.60	1.62	3.75	2.00	0.46	NS
Duration of having pets (yr)	0.5	14	3.29	2.78	4.15	1.00	0.47	NS
Age of pets(yr)	0.1	9	2.30	1.70	2.70	0.75	0.28	NS
Body weight (kg)	0.3	33	7.21	3.19	13.45	1.15	1.15	***
Feeding amount (gm)	10	800	196.73	110	353.75	11.00	28.98	***
Feeding frequency	2	4	2.50	2.77	2.17	2.00	0.11	*
Watering frequency	1	5	2.37	2.23	2.67	1.00	0.17	NS
Watering amount (ml)	10	450	84.83	33.27	184.17	10.00	17.52	***
Defecation frequency	1	2	1.03	1.08	1.00	1.00	0.04	NS
Urination frequency	2	6	3.37	3.19	3.33	3.00	0.15	NS
Sleeping area (sq ft)	2	18	7.57	5.92	9.42	3.00	0.59	**
Roaming area (sq ft)	100	3000	931.67	790.38	1233.33	225.00	111.23	NS
Disease recovery time (day)	3	60	13.77	8.84	23.00	15.00	2.12	**
Exercise frequency	0	2	0.27	0.23	0.50	0.00	0.08	NS
Exercise duration (min)	0	30	5.17	3.08	12.50	0.00	1.60	*

Min = Minimum, Max = Maximum, \* = Significant ( $p < 0.05$ ), \*\* = Significant ( $p < 0.01$ ), \*\*\* = Significant ( $p < 0.001$ ), NS = Not significant ( $p > 0.05$ )

### Owners' description

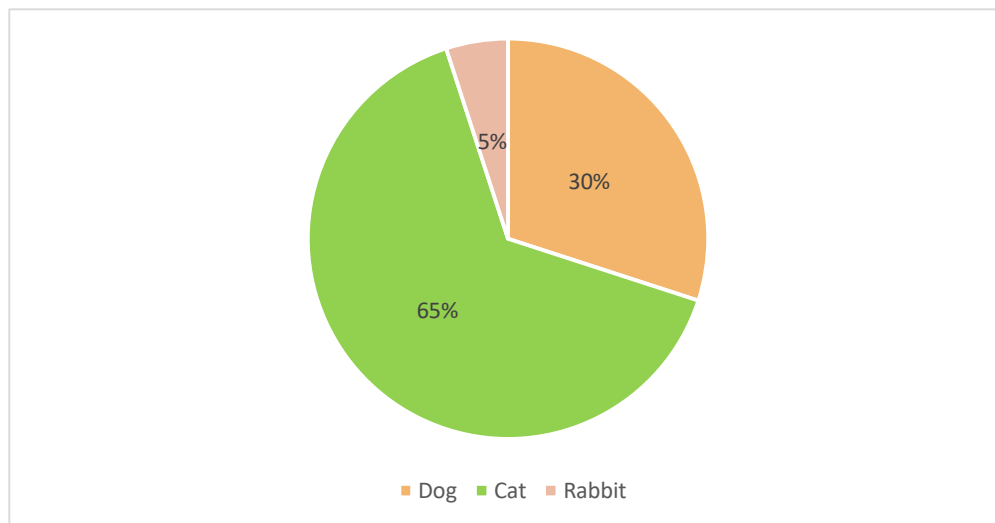
The owners of the pets were found to have different education level. The range of their educational qualification is from class eight to honours. It is noteworthy that most of them are undergraduate. Their education qualification is presented below in graphical form.



**Graph-1: Educational qualification of the pet owners**

### Type of the pets

In this study total 40 pets are included. Among them 12 are dog, 26 are cat, 2 are rabbit which is presented below in graphical form.



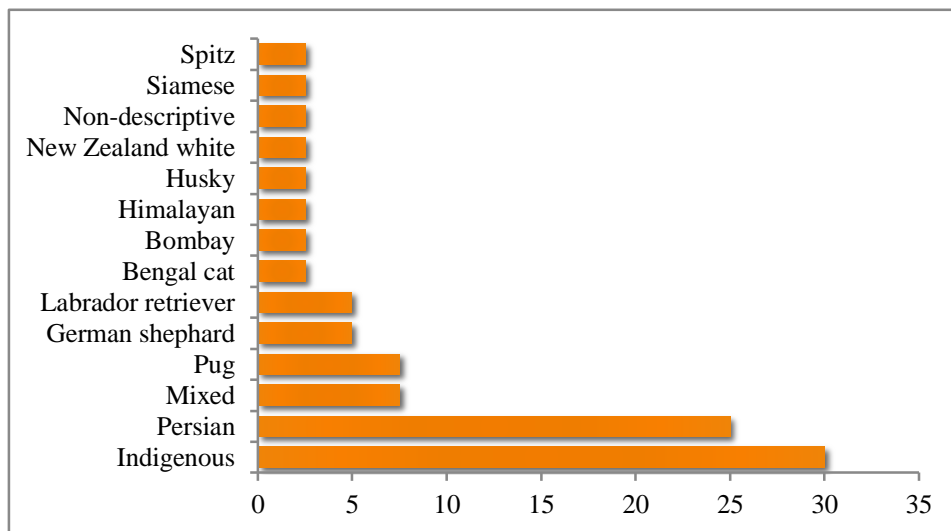
**Graph-2: Statistics of the pets**

## Age

The age of the pets is ranging from 3 months to 11 years. In this study it is observed that middle aged animal acquire good BCS than young and geriatric one.

## Breed

There are different types of breed e.g. Persian, Bengal cat, Himalayan, Bombay, Indigenous. Among them indigenous cat population is more. Among the dog population Spitz, Husky, Labrador retriever, German shepherd, Pug are found. Different types of breeds are shown below



**Graph-3: Breeds of the pets in graphical form**

## Body weight

The minimum, maximum and average body weight of the pets are 300 gram, 33 kg, 7 kg respectively. Among the three species (Dog, cat, rabbit), dogs were mostly found having good BCS and cats having overweight.

## Body condition score:

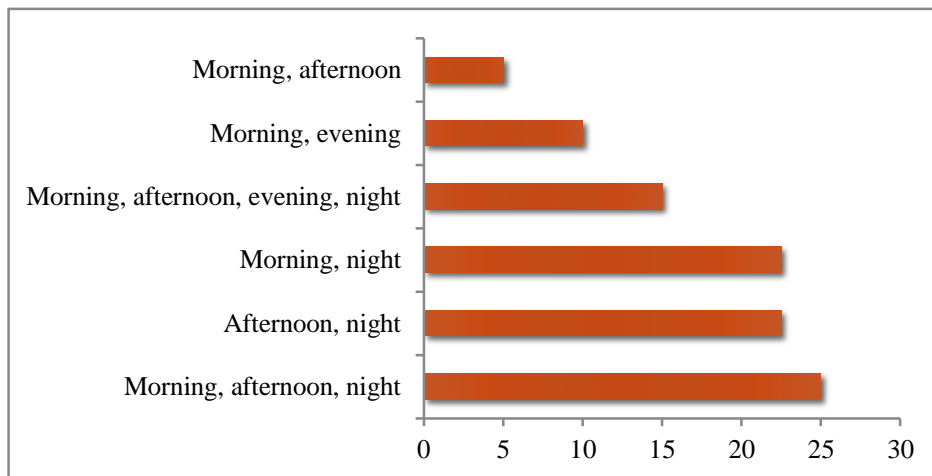
Body condition score was assessed by examination of ribs, waist, abdomen, neck, limbs, backbone. Body condition score of same species was varied depending on their age, sex, breed, feeding and exercise status. Body Condition Score (BCS) is categorized into 5 types. BCS of different pets are presented below in tabular form:

BCS	No of Dog	No of Cat	No of Rabbit
1	2	1	-
3	-	1	-
5	2	4	1
7	7	14	1
9	1	6	-

**Table-3: Statistics of body condition score of individual species**

### Feeding

The pets are feed minimum 10 gram and maximum 800 gram of feed per day following frequency of 2-3. The average feed consumption by the pet is approximately 193 gram. Feeding time of the pets is varying owner to owner which is shown below in graphical form.



**Graph-4: Feeding time of pets**

### Watering

The water intake by the pet is ranging from 10 ml to 450 ml. it is noticed that cat population tends to take less water than dog. That's why constipation is found more in cat.

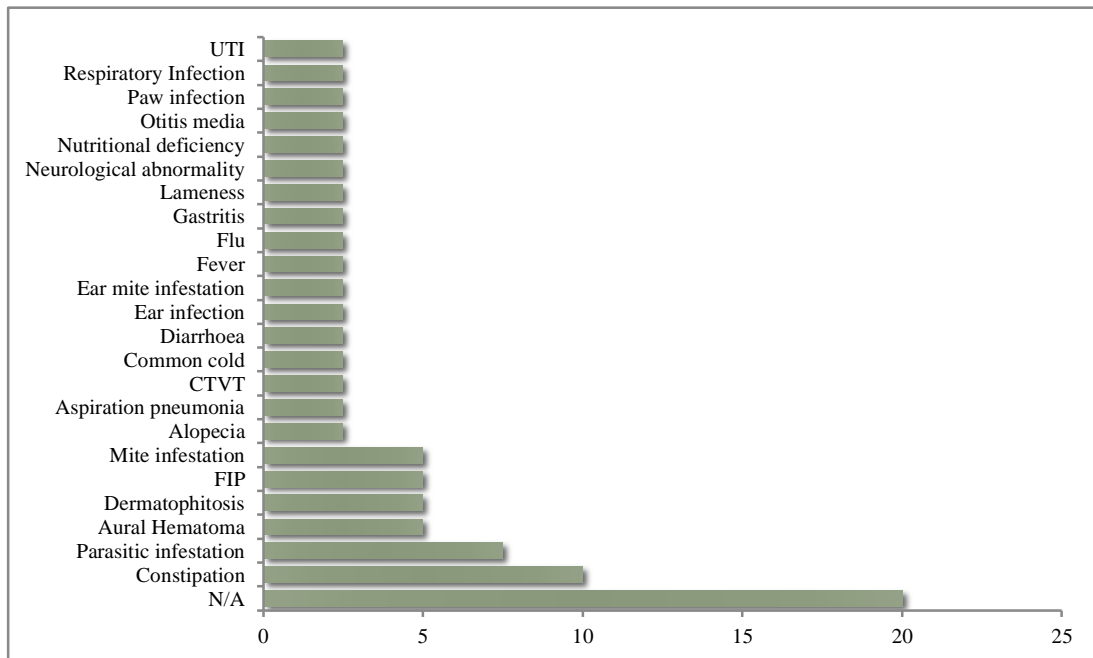
### Accommodation

Minimum and maximum sleeping area is 2 sq. ft. and 18 sq. ft. respectively. Roaming area of the pets is ranging from 100 sq. ft. to 3000 sq. ft. respectively.



## Disease recovery time

The pets were affected with different types of disease like respiratory tract infection, lameness, parasitic infestation, mite infestation, dermatophytosis, ear infection, feline infectious peritonitis, aspiration pneumonia, alopecia etc. Minimum disease recovery time is found 3 days and maximum disease recovery time is 60 days. Healthy animals require less time to recover from disease. Healthy animals have strong immune system due to their good body condition. Pets having different types of disease is presented in the following graph.



**Graph-5: Diseases of the pets**

## Exercise

Maximum owners did not get their pet to exercise. Few owners follow the exercise schedule about 30 minutes. Due to not having exercise pets are not with good body status. Especially dogs are getting obese gradually.

## CHAPTER- IV: DISCUSSION

The study has been conducted with 40 pets. Among them 12 were dog, 26 were cat, 2 were rabbit. Body condition score of 17.5% was overweight, 55% pet was good, 17.5% was fair, 2.5% was poor and 7.5% was Cachectic.

This study reveals that some of the parameters influence the BCS of pets. The owners keeping the pet for about more than three years bear more knowledge and their management of pet is good. It is observed that pets having BCS “Good” was privileged to get about 190-195 gram of feed daily maintaining feeding frequency 2.5/day. The cats are fed dry feed mostly and amount of water provided is about 10-25 ml per cat. In dry feed, amount of fibre is negligible. Due to less water intake and low dietary fibre, the cats are affected with constipation (Little, 2011). Chronic constipation indirectly affect the body condition score. Due to constipation cat lose the appetite. Subsequently feed intake tends to cease and the body condition score of cat deteriorate. 7.5% pets were cachectic. They were provided with 10-25 gram of feed/ day and the feeding frequency was 2/ day. For consuming less amount of feed the pets’ body condition score is low.

The overweight pets are provided with heavy meal having frequency 4/ day but are not experienced any exercise. That’s why the pets gained weight day by day. Generally the obese animals bear low immunity (Chandra, 1980). It is noticed that these pets are repeatedly getting sick. Obesity in dogs and cats increase the risk of health problems. These problems include ‘orthopaedic disease, diabetes mellitus, abnormalities in circulating lipid profiles, cardiorespiratory disease, urinary disorder, reproductive disorder, neoplasia, dermatological diseases and anaesthetic complications (Sandøe *et al.*, 2014).

Exercise is one of the factors to maintain the body condition status. In this study it is found that 25% pets are taken to walk or to run on an average for only 5 minutes. And their body condition score is good. 50% of the rest pets did not get any exercise and their BCS tends to be obese (Roudebush *et al.*, 2008).

Minimum roaming area for these pet animals was 100 sq. ft. and maximum roaming area was 3000 sq. ft. On an average they got 931 sq. ft. to roam around. This factor has affected the body condition score of the pets (Roudebush *et al.*, 2008). Roaming acted as the alternative of direct exercise. The pets walked or ran in this area for playing purpose or exploring something. Out of 40 pets, 55% pet got this privilege and their body condition score is good.

About 40% pets are not treated with anthelmintic. Their parasitic infestation rate is high which affect the body condition score of pets. The nutrient is consumed by worm gut which is required to maintain the nutritional level and growth of the pet (Palmer *et al.*, 2010).

On the contrary 55% pets having BCS “good” recovered from disease within 5 days. This implicate their strong immune system which helps in quick recovery from the disease (Otsuji *et al.*, 2016).

## **LIMITATIONS**

The time was limited to conduct this study. So it was not possible to conduct the study with large sized population. An ongoing pandemic also limited to collect data. Some pet owners could not provide specific data regarding their pets. There was no specific fund available to conduct the research in a large scale. As this study is important both for pet owners and veterinarian, it can be performed with larger population size in future to get the overall picture of health, nutrition and management of the pet animals.

## **CHAPTER-V: CONCLUSION**

Body Condition Score is a method commonly used in the assessment of nutritional status in small animal. Nutritional status can be measured by BCS without any tools. That is why BCS is used by clinical veterinarians in the world. BCS has been recognized as one of the nutrition assessment by American Animal Hospital Association (AAHA) in 2010. Pet owners also can be benefitted by BCS to maintain the health of their pet. A pet owner is suggested to maintain the standard body condition status by following a balanced diet as per requirement of nutrition considering the age, weight and activity of the pet.

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**The Author**

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## **Biography**

The author is Sagor Ahammed, son of Md. Mokter Ali and Suraia Parvin. He passed his Secondary School Certificate in 2012 (G.P.A-5.00) followed by Higher Secondary Certificate in 2014 (G.P.A-5.00) from Cumilla Cadet College. He enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU) in the session of 2015-2016. He is very enthusiastic to be a researcher and eager to be a skilled veterinarian in future.