Research Article

EFFECT OF PRE-CALVING BCS ON POSTPARTUM BCS AND BODY WEIGHT CHANGE OF SAHIWAL CATTLE

V. Sharma, A. K. Jhirwal, S. C. Goswami, V. Kumar, V. Singh*, B. P. Meena

ABSTRACT: A total of 18 Sahiwal cattle of 1st to 4th parity were selected for the study and distributed into three different groups based on their pre calving body condition score (BCS) (before 15 days of expected date of calving) namely G1 (2.50 - 3.00), G2 (3.25 - 3.75) and G3 (4.00 and above) with six animals in each group. There was decrease in BCS after calving in all the BCS groups. In G1 group BCS loss started from calving and continued up to 60th day and was found to be significant (p<0.05) at 45 days. After that BCS increased non-significantly and reached to 2.45±0.041 at 90th day post-partum. Significant (p<0.05) loss of BCS in G2 group, started from 1st fortnight of calving and continued up to 60th days post-partum then BCS remains constant up to 90th days, In G3 group significant (p<0.05) loss of BCS started from 1st fortnight of calving and continued up to 45th day post–partum then remains same up to 60th day. Thereafter, it increases non-significantly from 60th day to 90th day. The highest loss of BCS was observed in animals of G2 group during entire study period. There was significant loss (p<0.05) in the BCS between different three groups up to 90th day post-partum. There was significant loss in the body weight (BW) among the groups (p<0.05) from calving day to 90 days post-partum.

Key words: Sahiwal, Body condition score, Post-partum, Body weight, Fortnight.

INTRODUCTION

The body weight of animal did not provide reliable estimate of the energy reserves, as the reserves vary about 40% in animals with same body weight which directly or indirectly affects the performance of dairy animal (Andrew *et al.,* 1994). To overcome this, Lowman *et al.* (1973) introduced the body condition score (BCS) system developed for feeding strategies of animal in such a way that animal is neither too thin nor too obese.

Animal with high BCS at calving are more prone to milk fever, ketosis and downer cow syndrome (Garnsworthy and Topps 1982). Thus, BCS has received considerable attention as a tool to aid in the management of nutritional and production programs in dairy herds.

The body condition scoring (BCS) is a subjective estimate of the energy reserves in adipose tissues of a dairy cow. It is an acceptive, non-invasive, quick and inexpensive method to estimate degree of fatness. It is a means of accurately determining body condition of dairy cows, independent of body weight and frame size. It is based on evaluation of the external appearance of the animal that interacts with its body fat reserves (Rao and Anitha 2013).

It is evinced that the profile of lactating cows in milch barn is different e.g. some may be in early lactation and the others may either be in mid or late lactation. The observations on body condition status of animal will help the manager to adopt corrective management measures, thus enabling to improve the production profile of an animal. Hence, body condition scoring may be used as an efficient tool in this regard. Although many may consider this as a nutritional management practice, but changing BCS have implications on milk yield, health, reproduction, longevity and overall profitability of an animal. (Mishra *et al.* 2016). Body condition score (BCS) is one of those 2 measures which is widely used in many species to assess body composition and energy status of animals (de Vries and Veerkamp 2000, Veerkamp *et al.* 2001).

The body condition in dairy animal is usually judged through a 5-point scale, with 1-point equivalent to an extremely lean cow, while 5 point to a cow having excessive fat reserves (Peters and Ball 1988).

Department of Livestock Production Management, College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Sciences, Bikaner-334001, Rajasthan, India.
Corresponding author. e-mail: dr.vikrampoonam@gmail.com.

MATERIALS AND METHODS
Experimental design

Eighteen Sahiwal cattle were distributed into three separate groups based on their pre-calving BCS (15 days before expected date of calving) namely G_1, G_2 and G_3 with six animals in each group as shown in Table 1.

Selection and management of Sahiwal cattle

A total of 18 Sahiwal cattle of 1st to 4th parity was selected for the study. The experimental Sahiwal cattle shed was properly brushed with the help of broom, washed and cleaned by forced water. Wall and floor of the house was disinfected by using phenyl solution. Manger shed and other necessary equipments were properly washed. The experimental animals were fed according to their body weight and production (NRC 1989). Sahiwal Cattle was maintained in intensive system. Half of the total required quantity of feed offered daily at morning 5.30 AM and rest of amount offered in the afternoon 3.00 PM. The water was kept available to animals round the clock.

Body condition score

To assess the body condition of the animal with fairly high accuracy, a simple technique called body condition scoring has been described, which is being used in many developed and some developing countries. For recording the body condition of animals, following points will be taken into account:

a) Vertebral column (chine, loin and rump) flesh covering at the spinous processes of these regions.

b) Spinous processes- their prominence and sharpness.

c) Tail head region- prominence of depression backbone and pins and between pin and hook bones.

Considering above points Ferguson *et al.* (1994) formulated a score chart which was adopted in the present study. The BCS of experimental animals under Investigation was recorded on fortnightly interval till the end of experiment. The Body condition scoring chart has been presented following Ferguson *et al.* (1994).

Body weight of animal

The body weight of each animal was calculated with the help of body measurements at fortnightly interval up to 90 days of lactation by using Agarwal's formula as outlined below:

$$\text{Live body weight (in kg)} = \frac{\text{Length (inches) x Chest Girth (inches)}}{Y}$$

Where,
Y= 9.0 if girth is less than 65 inches
Y= 8.5 if girth is between 65 to 80 inches
Y= 8.0 if girth is more than 80 inches

Table 1. Grouping of the cattle based on their pre-calving BCS.

Grouping of the cattle based on their pre-calving BCS Groups	No. of animals	BCS
G_1	6	2.50 - 3.00
G_2	6	3.25 - 3.75
G_3	6	4.00 and above

Body condition scoring chart (adopted from Ferguson *et al.* 1994).

	Tuberosity- appearance /fat pad		Thrul	Ligaments-appearance		Appearance
BCS	Ileal	Ischeal	V	Coccygeal	Sacral	Spinous processes
<2.0	Angular- none	Angular- none	V	S	S̲	Angular > 8 cm visible
2.25	Angular- none	Angular- none	V	S	S	Angular > 8 cm visible
2.50	Angular- none	Angular-fat pad	V	S	S	Angular 6- 8 cm visible
2.75	Angular-fat pad	rounded-fat pad	V	S	S	Angular 6- 8 cm visible
3.00	rounded-fat pad	rounded-fat pad	V	S	S	Angular 6- 8 cm visible
3.25	rounded-fat pad	rounded-fat pad	U	S	S	Angular 4- 6 cm visible
3.50	rounded-fat pad	rounded-fat pad	U	B	S	rounded 4- 6 cm visible
3.75	rounded-fat pad	rounded-fat pad	U	NV	B	rounded 0- 2 cm visible
4.00	rounded-fat pad	rounded-fat pad	U	NV	NV	rounded 0- 2 cm visible
>4.00	rounded-fat pad	rounded-fat pad	Flat	NV	NV	rounded 0 cm visible

*S: Sharp, B: Blunt, NV: Not Visible.

Table 2. Fortnightly changes in BCS from calving to 90 days postpartum in Sahiwal cattle.

Fortnight Intervals (days)	BCS groups		
	G1	G2	G3
At calving	2.79 ± 0.076^{cX}	3.5 ± 0.091^{dY}	4.12 ± 0.055^{cZ}
15	2.66 ± 0.105^{bcX}	3.33 ± 0.083^{cdY}	3.95 ± 0.041^{bcZ}
30	2.54 ± 0.076^{abX}	3.20 ± 0.083^{bcY}	3.83 ± 0.052^{bZ}
45	2.45 ± 0.041^{abX}	3.04 ± 0.076^{abY}	3.66 ± 0.052^{aZ}
60	2.41 ± 0.052^{aX}	2.95 ± 0.076^{aY}	3.66 ± 0.052^{aZ}
75	2.41 ± 0.052^{aX}	2.95 ± 0.076^{aY}	3.70 ± 0.100^{aZ}
90	2.45 ± 0.041^{abX}	2.95 ± 0.100^{aY}	3.75 ± 0.091^{bZ}

[Different superscript in a column (Small letter a,b,c,d) differ significantly ($p<0.05$).
Different superscript in a row (Capital letter X, Y, Z) differ significantly ($p<0.05$)].

Table 3. Fortnightly changes in body weight (Kg.) before calving (3-4 days) to 90 days postpartum in different BCS groups of Sahiwal cattle.

Fortnight Intervals (days)	BCS groups		
	G1	G2	G3
Before calving	367.89 ± 1.16^{eX}	382.73 ± 1.49^{eY}	394.79 ± 0.81^{dZ}
15	335.18 ± 0.98^{dX}	351.95 ± 1.12^{dY}	362.81 ± 0.74^{cZ}
30	332.23 ± 1.07^{cdX}	348.85 ± 1.26^{cdY}	359.04 ± 1.03^{bZ}
45	329.72 ± 0.94^{bcX}	345.83 ± 1.29^{bcY}	356.23 ± 1.15^{abZ}
60	327.01 ± 1.02^{abX}	342.76 ± 1.36^{abY}	353.30 ± 1.46^{aZ}
75	325.46 ± 1.32^{aX}	340.43 ± 1.12^{aY}	354.37 ± 1.51^{aZ}
90	327.12 ± 1.36^{abX}	342.32 ± 1.20^{abY}	355.44 ± 1.53^{aZ}

[Different superscript in a column (Small letter a,b,c,d,e) differ significantly ($p<0.05$).
Different superscript in a row (Capital letter X, Y, Z) differ significantly ($p<0.05$)].

Analysis of data
The collected and tabulated data was analyzed by using SPSS 20.0.

RESULTS AND DISCUSSION
Body condition score (BCS)
The fortnightly changes in BCS pattern after calving to 90 days post-partum in Sahiwal cattle are presented in Table 2.

The result of the present study indicated that there was a decrease in BCS after calving in all the groups. In G1 group BCS loss started from calving and continued up to 60th day with a loss of 0.38 on 5 BCS point scale which was found to be significant ($p<0.05$) up to 45 days. After 60 days the BCS remains same up to 75th day. Then BCS Increases from 75th day to 90th day. However, there was no significant increase in BCS from 60th day to 90th day of post-partum.

Loss of BCS in G2 group started from 1st fortnight of calving and continued up to 60th day post-partum then BCS remains constant up to 90th day with 0.55 BCS loss, In G3 group Loss of BCS started from 1st fortnight of calving and continued up to 45th day post partum then remains same up to 60th day with a loss of 0.46 on 5 BCS point scale and then increases from 60th day to 90th day. The losses were found to be significant ($p <0.05$) in G2 and G3 group from the day of calving to 60th day and 45th day, respectively. Whereas, BCS increased non significantly from 60th days to 90th days in G3 group.

The maximum loss of BCS was observed in animals of G2 group during entire study period. There was significant loss ($p <0.05$) in the BCS between different three groups up to 90th day post-partum.

Similar findings were reported by Domecq *et al*. (1997), Dechow *et al*. (2002), Bannuvalli *et al.* (2014) in crossbred dairy cattle and Lakhani (2015) in Murrah buffalo.

Body weight
The body weight changes at fortnightly intervals from calving to 90 days post-partum in Sahiwal cattle are presented in Table 3.

Loss in the body weight (BW) from the day of calving to 90 days post-partum differed significantly among the groups ($p<0.05$).

The G1 and G2 of group animal body weight loss started from 1st fortnight post-partum and continued up to 75th day and in G3 up to 60th day thereafter increased up to 90th day. The BW loss in G1, G2 and G3 were during study period with loss of 40.77 kg, 40.41 Kg, 39.35 kg/animal, respectively in G1, G2 and G3 groups. The BW loss differed significantly ($p<0.05$) in G1, G2 and G3 groups animals up to 60 days.

Similar findings were reported by Treacher *et al*. (1996), Mushtaq *et al*. (2010) and Banuvalli *et al*. (2014).

CONCLUSION
In present study was concluded that an early lactation BCS decreased in all the groups and the highest decrease of body condition score occurred in moderate calving BCS (3.25- 3.75) animals which is around 0.55 point.

There was significantly loss in the body weight (BW) among the groups ($p<0.05$) from calving day to 90 days post-partum.

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