

Postpartum Performance of Dairy Cows in Response to Body Condition Score, Locomotion Score, Suckling and Postpartum Diseases in Up Country Large Farm in Sri Lanka

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Abstract

Approaches for reducing prolonged postpartum anestrus among the dairy cattle has become a focal point in modern dairies to maximize reproductive efficiency. This study determined the postpartum performance of cows based on suckling, nutrition, body condition score (BCS), locomotion scores (LCS) of selected herds in up country in Sri Lanka. Experiment 1, Thirty cows (n=30), just after calving were used under three experimental categories. (G0=control, G1= suckling 4 times (5 minutes each) G2 = 8 times (5minute of each suckling). Mean postpartum lengths were 52.3, 60.9, 63.6 days in G0,G1 and G3 group, respectively (p=0.0427). In experiment 2, BCS were scored weekly up to 7 weeks of twenty (n=20) peripartum cows from postpartum day 1, based on 1-5 body condition scoring system. Body condition has significant effect on postpartum length (p=0.0009) showing mean postpartum lengths as 57 (BCS=1-2), 64.5 (BCS=3-4), 45.46 (BCS=2-3) days. In experiment 3, health status was observed in sixty four cows (n=64) in first 45 days of postpartum. Milk fever, mastitis and displaced abomasum have significant effect on postpartum length (p=0.0001). In experiment 4, 68 cows (n=68) were scored weekly up to 4 weeks following 1-5 locomotion scoring system (LMS). Mean postpartum lengths were 42.6 (LMS=1), 53.95 (LMS=2), 104 (LMS=3), 123.33 (LMS=4) days. LMS had a significant effect on postpartum length. In conclusion, prevention of suckling, maintaining appropriate BCS, lower LMS and absent of post-partum diseases are vital to maintain the reproductive performances and to maintain shorter post-partum anestrus in dairy cattle in up-country dairy farms in Sri Lanka.

Keywords: Body condition, Dairy cattle, Locomotion, Postpartum anestrus, Suckling, Sri Lanka

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Introduction

The most crucial goal of dairy farm is to maintain the reproductive efficiency across the herd. One of the greatest challenges for dairy continues to be in the area of nutrient management and reproductive management. Postpartum anestrus, conception rate, reproductive disorders and health are crucial parameters having critical role on regulation of voluntary waiting period and ultimately open period of dairy herd. Postpartum anestrus is the period after parturition during which cows do not show behavioral signs of estrus because both ovaries under static condition (Magamage *et al.* 2011) due to the absence of proper neuro-endocrine stimuli for follicle development up to the level of ovulation.

Nutritional status is known to be the one of the most common factor that triggers the postpartum anestrus. Also, addressing the animal's national requirement is essential to resume the

post-partum ovarian activity (Robinson, 1990). Negative energy balance, during postpartum in the dairy cow reduces performance and production. Lameness increases the number of services per conception and consequently lowers conception rates to first service (Hernandez *et al.* 2001). It is important to investigate how lameness influences the reproduction performance under Sri Lankan farming conditions.

Diseases also play a vital role on reproductive performances. Several diseases usually occur during the first 2-3 weeks after calving. They may have negative correlation with milk production and reproduction capability of dairy cow. Objectives of the current study was to identify effect of suckling, nutrition, body condition, selected diseases such as milk fever, mastitis, displaced abomasum and lameness with the reproductive performances mainly on the length of postpartum anestrus of dairy cattle

in Bopathalawa dairy farm in Sri Lanka. Also, expected to highlight the effect of management practices such as suckling on the profitability and the sustainability of the farm and to ensure that BCS and LMS key metrics to measure the reproductive efficiency.

Materials and Methods

Experiment 1

Effect of Suckling on the duration of postpartum anestrus

Thirty just calved healthy cows (n=30) in third lactation were selected. Body condition scoring was between 2-3 according to 1 to 5 scoring systems. There were three experimental groups each having 10 cows.

Group 0 (G0) = control group

Group 1 (G1) = suckling up to one days

Group 2 (G2) = suckling up to two days

The calves of G1 and G2 cows were kept with their mothers only when suckling. Every day cows were observed when they were in first estrous.

Experiment 2

Effect of postpartum nutrition on duration of postpartum anestrus

Body condition of cows (n=20) were used as an indicator for nutritional condition, assuming poor nutrition may leads poor body condition and over nutrition may cause higher body condition. 1-5 body condition scoring system was used and prepared a chart for 1-5 body condition score referring a standard system.

Experimental 3

Effect of Milk fever (Hypocalcemia), Displaced abomasums and Mastitis on duration of postpartum anestrus

All data were collected from farm records. Data was collected from 2015. 06. 01 to 2015. 08. 01. The treatment register was referred and collected the data on the occurrence of diseases relevant to above cows (n=64) within first 45 days of postpartum period. All register was referred to collected data relevant to duration of postpartum anestrus.

Experimental 4

Effect of hoof health (Locomotion) on duration of postpartum anestrus

Locomotion scoring was used as an indicator for hoof health, assuming better the hoof health higher the locomotion score. Sixty-eight (n=68) experiment cows were ranked according to standard 1-5 locomotion scoring system.

Statistical analysis

All the data were analyzed using SAS 9.1 (Statistical Analyze System) version with following one-way ANOVA procedure to observe the effect on postpartum anestrus. Duncan's multiple range test with GLM procedure was used to analyze the unbalance data. All the graphs and tables were made by using MS Excel 2016 version.

Result and Discussion

Postpartum anestrus of non-suckled was 52.3 days showing the significant difference with mean value of postpartum length of directed suckled cows 60.9, 63.6 days respectively in G1 and G2 groups. Starting of estrous behavior after calving is partly determined by the ability of the hypophysis to secrete adequate amounts of LH. Suckling delays the release of hormones which need for resumption of estrous cycles after parturition, cows that lose their calf at birth commonly show estrus earlier than cows of those have suckling calves. According to Williams (1990) suckling reduced the hypothalamic release of GnRH, which results in insufficient pulsatile LH release.

There was a significant difference in the duration of postpartum anestrus between BCS2-3 with BCS1-2 and BCS3-4. The mean length of postpartum anestrus was 64.5 days of 1-2 BCS group. Cows who were in 2-3 scoring level showed 45.46 days of average postpartum anestrus and 57 days of postpartum anestrus period was observed in 3-4 BCS group of cows. Also, the results showed that there was a significant difference in duration of postpartum anestrus between BCS2-3 with BCS1-2 and BCS3-4. Normally cows use their reserves for milk production, which means a significant loss of body weight and a progressive decrease of BCS was resulted. This leads to a delay in resumption of postpartum ovarian activity because of the cow's priority is for milk production and not for the establishment and maintenance of estrous cycles and it is well known that the animal should be in optimum nutritional condition, in order to resume the post-partum ovarian activity (Robinson, 1990). When nutrient intake is inadequate and body energy reserves are depleted, interval from calving to first estrus is extended.

There was a significant effect of postpartum diseases in selected cows on the duration of postpartum anestrus. Mean postpartum anestrus were 49.09 days, 80.6 days, 75 days,

71.25 days respectively in healthy group, milk fever cows, Mastitis and displaced abomasum's cow groups respectively. Metabolic disorders in the postpartum period are more likely to have increased incidence of mastitis, lameness and endometritis and all of which contribute to reduced reproductive efficiency (Peake *et al.*, 2011, Williams, 1990).

According to the locomotion scoring guide there is a positive correlation between LMS and lameness. Lameness stress has negative impact on reproductive hormones from the hypothalamus-pituitary-ovarian axis. Pain and discomfort reduced reproductive efficiency (Peake *et al.*, 2011).

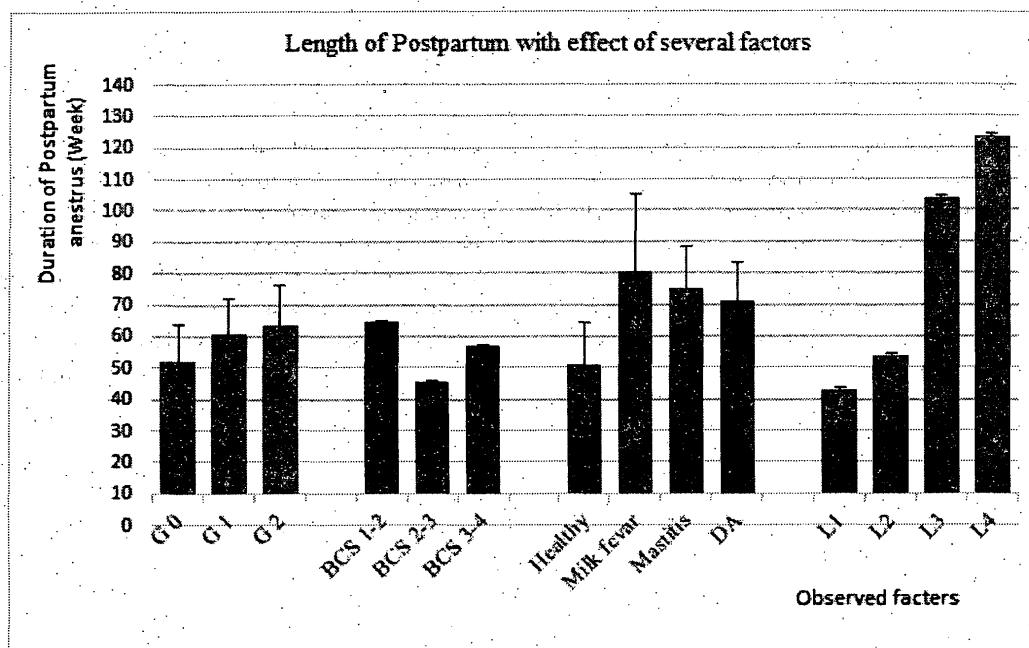


Figure 1: Effect of Suckling, Body condition, Health conditions and Locomotion score on the Length of Postpartum anestrus. BCS 1-2, BCS 2-3, BCS 3-4= indicate the effect of Body Condition Scoring on the length of Postpartum anestrus. L1 = effect of locomotion score 1 on the length Postpartum anestrus, L2 = effect of locomotion score 2 on the length Postpartum anestrus, L3= effect of locomotion score 3 on the length of Postpartum anestrus, L4=effect of locomotion score 4 on length of Postpartum anestrus.

Results showed that, 21.97% of diseased cows from total 64 selected cow group (9.47% milk fever, 6.25% mastitis and 6.25% displaced abomasum). It has been reported that peak milk production reach at 5-7 weeks postpartum (Robinson, 1990). Robinson, (1990) has reported that cows suffer from negative energy balance resulting in disequilibrium at the peak of milk production.

This negative energy balance was associated with an increased risk of developing various diseases, reproductive disorders and changes in milk production (Peake *et al.*, 2011).

Average Length of post-partum anestrus on LMS=3 and LMS=4 groups were respectively 104 days and 123.33 days, those were higher than the average values of LMS=1 and LMS=2 groups (42.69 days and 53.95 days respectively).

According to the cows those lame within 30 days of post calving have taken 2.63 times to develop ovarian cysts than the cows without lameness within the first 150 days of lactation (Peake *et al.*, 2011). Also, they were having half chances to become pregnant than cows without lameness within the first 150 days of lactation. Lameness reduces estrus intensity in dairy cows (Peake *et al.*, 2011). Locomotion score 3 or above indicative of the poor hoof health related lameness. Since, the LMS > 2 predicts poor reproductive efficiency (Peake *et al.*, 2011).

In conclusion, the suckling, nutrition and body condition, diseases and locomotion were found to have significant role on postpartum anestrus and indirectly associated with failure of reproductive performance of dairy cattle. Avoiding suckling, Maintaining appropriate BCS, lower LMS and absent of post-partum diseases are vital to maintain higher reproductive

performances. Above conditions also helps to maintain the lower post-partum length in dairy cattle in up-country dairy farms in Sri Lanka.

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