

POSTPARTUM PERFORMANCE AS INFLUENCED BY BODY WEIGHT CHANGES AT PARTURITION IN BUFFALOES

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ABSTRACT

Twenty normal parturient Murrah buffaloes were divided into 2 groups of 10 each depending upon their body weight loss at parturition compared to the one week prepartum, i.e. Group I (G I) lost more than 10% while Group II (G II) lost less than 10%. The animals in G I continued to lose more weight than G II till 8th week post partum. Lowest body weight was recorded at 6th week postpartum in both the groups followed by an increase thereafter. Milk yield continued to increase till 4th week in G I and 5th week postpartum in G II followed by a decline. A negative ($r = -0.495$, $P < 0.05$) correlation between percent weight loss and milk yield was recorded. Lactation yield was significantly ($P < 0.05$) lower in G I (1401.14 ± 210.44 kg) than G II (2021.40 ± 172.25 kg). Days to first postpartum estrus, day's open and number of services per conception were higher in G I than G II. Calf weight did not differ but fetal membrane weight was higher in G I compared to G II. It can be inferred that Murrah buffaloes which lost more weight at parturition compared to one week prepartum continued to lose more weight till 8th week postpartum, had significantly lower lactation yield and poor reproductive efficiency in terms of postpartum estrus interval, days open and number of services per conception. Negative energy balance might be the contributing factor, which needs to be rectified to improve production as well as reproduction in high yielding Murrah buffaloes.

High yielding buffaloes suffer from negative energy balance; utilize body reserves leading to more body loss. Negative energy balance may cause endocrine disturbances leading to impaired ovarian / uterine function, thus resulting in poor reproductive efficiency and ultimately economic losses. Some studies on the impact of postpartum weight loss on consequent production and reproductive efficiency have been reported in bovines. (Tiwana *et al.*, 1994; Rao *et al.*, 1996; Reksen *et al.*, 2001) but are inconclusive. Not much information on the subject in buffaloes is available. Thus, the present investigation was conducted to assess the impact of postpartum weight loss on consequent gain, milk yield and reproductive efficiency in Murrah buffaloes.

Twenty Murrah buffaloes maintained at the dairy farm of the Punjab Agricultural University, Ludhiana and divided into two groups of ten each on the basis of postpartum body weight loss just after calving compared to one week pre-partum i.e. Group I which lost more than 10 per cent body weight on day of calving and Group II which lost less than 10 per cent body weight

on day of calving. The animals were kept under semi loose housing system under standard management conditions. Weekly body weights were recorded commencing two weeks prepartum till eighth week postpartum. The weight of new born calf and the expelled fetal membranes were recorded within 30 minutes after parturition. Daily milk yield of each animal was recorded for whole lactation. Estrus was detected using a vasectomized bull at 5:00 to 7:00 hr and 17:00 to 19:00 hr. The animals were inseminated with frozen semen. Pregnancy was detected per rectum at 60 days post insemination.

Average values of production, reproduction parameters and weekly body weight changes in different Groups have been depicted in Table 1 and Table 2 respectively. Calf weight at birth did not vary but placenta weight was higher in Group I (4.34 ± 0.28 kg) than Group II (3.99 ± 0.14 kg). Lactation yield was significantly ($P < 0.05$) depressed in Group I (1401.14 ± 210.44 kg) than Group II (2021.40 ± 172.25 kg). Milk yield continued to increase till 4th week postpartum in Group I and 5th week postpartum in Group II. Peak yield was lower in Group I (11.36 ± 1.13 kg) compared to Group II (12.99 ± 1.15 kg). First postpartum estrus interval was longer in Group I (67.30 ± 14.43 days) compared to Group II (61.1 ± 19.48 days). Similar trend was observed in day's open

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ie 297.00 ± 32.54 days in Group I v/s 207.6 ± 46.46 days in Group II. Higher number of services per conception were recorded in Group I (3.38 ± 0.70) than Group II (2.40 ± 0.81).

It is evident from the study that buffaloes losing more body weight ($P < 0.5$) at parturition continued to do the same till 8th week postpartum. They also produce less milk and had lower reproductive efficiency. Lowest body weight was observed at 6th week postpartum in both the groups. The postulated reasons may be that the animals may not be getting sufficient nutrients to maintain the mammary function leading to loss of body reserves causing negative energy balance.

Service period in the heavier buffaloes at calving was lower and daily milk yield higher, but lower lactation length due to the better fertility (Rao *et al.*, 1996). Dhillon *et al.*, (1994) observed that high postpartum weight loss and milk yield had no effect on postpartum ovarian activity, but had an adverse effect on uterine environment in buffaloes. Bhat (1999) recommended additional concentrate feeding 21 days prepartum in cows and buffaloes to increase postpartum production and decrease weight loss. In dairy cows, lower plasma insulin and glucagon and increased fat mobilization were observed when no additional energy for fetal development was fed during the last 10 weeks of gestation (Nishida *et al.*, 1999), which may disturb the reproductive endocrine balance. Looper *et al.*, (2003) observed that relationship between body condition and the resumption of reproductive processes are poorly understood in cows.

In the present investigation, a significantly negative correlation ($r = -0.495$; $P > 0.05$) was observed between weight loss and lactation yield. Competition between fertility and milk yield was due to physiological and not genetic factors (Patten *et al.*, 1995). Negative energy balance in postpartum period lead to delayed postpartum

ovarian activity (Reksen *et al.*, 2001). In buffaloes, milk yield was negatively correlated with number of services per conception and body weight at first calving (Tiwana, *et al.*, 1994). In cows ovulation failure is associated with greater production of 4% fat corrected milk and reduced concentration of peripheral IGF-I (Bream and Butler, 1998). Higher yield is associated phenotypically and genetically with reduced reproductive performance in lactating cows (Nebel and McGilliard, 1993). The reason is that selection for milk yield increases blood somatotropin and prolactin and decrease insulin, which is important for follicular development. In cattle (Carlos 2004) reported that animals losing more weight postpartum produce less milk and had poor conception rate. In order to resume cycles, the cow must overcome the negative effect of the low nutrient intake (John Hall, 2004). Youdan and King (1977) reported that improvement in fertility is possible if cows are gaining weight at the time of service. The effect of negative energy balance at parturition is dominated by the toxic action of NEFA's on follicles and oocytes rather than by the effect of a low blood insulin concentration on LH pulsatility (Kruip *et al.*, 1999). In high yielding dairy cows, peak milk yield and mobilization of body tissues are associated with an increase in the ratio of plasma somatotropin to insulin (Vasilatos and Wangness, 1981; Herbein *et al.*, 1985). High milk producing cows lead to more body weight loss and proper management be practiced to overcome the problem (Pugashetti *et al.*, 2009)

It can be concluded that higher weight loss at parturition compared to one-week prepartum is an indicator of consequent negative growth, lower milk yield and decreased reproductive efficiency. This may be due to disturbed endocrine balance and negative energy balance. Additional pre and postpartum nutrient feeding should be planned in high yielding buffaloes to prevent postpartum metabolic disorders.

Table 1: (Mean \pm SE) values of body weight loss and production parameters in different groups.

Groups	Average b wt loss up-to 6 weeks postpartum	Peak milk Yield (kgs)	Lactation yield (kgs)	Postpartum estrus interval (days)	Number of services per Conception	Days open	Calf Wt at birth (kgs)	Placenta Weight (kgs)
Group I	5.88 (%)	11.36 ± 1.135	1401.14 ± 210.44	67.30 ± 14.43	3.38 ± 0.70	297.0 ± 32.54	33.350 ± 2.285	4.337 ± 0.280
Group II	3.70 (%)	12.99 ± 1.15	2021.40 ± 172.25	61.10 ± 19.48	2.40 ± 0.81	207.6 ± 46.46	33.700 ± 1.415	3.988 ± 0.144

Table 2: Mean weekly body weight (kg +SE) changes in different groups.

Groups	Weeks									
	-1	0	1	2	3	4	5	6	7	8
Group I	545.2 ± 17.22	475.4 ± 15.59	470.5 ± 15.69	462.0 ± 17.57	458.0 ± 16.02	458.6 ± 12.39	457.4 ± 13.12	447.4 ± 13.43	453.77 ± 14.07	453.25 ± 22.07
Group II	588.5 ± 18.04	540.0 ± 16.69	537.3 ± 16.47	539.0 ± 12.31	531.0 ± 16.17	521.0 ± 14.76	521.4 ± 14.29	520.0 ± 15.15	529.5 ± 13.89	535.4 ± 11.58

REFERENCES

- Bream, S. W. and Butler, W. R. (1998). Energy balance, metabolic hormones and early postpartum follicular development in dairy cows fed prilled lipid. *J. Dairy Sci.*, **81**(1): 121-131
- Bhat, A.S. (1999). Effect of special feeding on blood profile of cows and buffaloes. *Indian Vet.*, **76**:501-505.
- Carlos, A. Risco, 2004, managing the postpartum cow to maximize pregnancy rate, 10 Proceedings Florida Dairy Reproduction Road Show.
- Dhillon, J. S., Tiwana, M.S. and Bhalaru, S.S. (1994). Body weight changes during early Lactation and its influence on reproductive performance of buffaloes. Proc. 4th World Buff. Cong., Sao Paulo, Brazil, 27-30 June, 1994, Vol 3, 1994, 555-557.
- Herbein, J.H., Aiello, R.J., Eckler, L.I., Pearson, R.E. and Akers, R.M. (1985). Glucagon, insulin, growth hormone and glucose concentration in blood plasma of lactating cows. *J. Dairy Sci.*, **68**: 320.
- John Hall, 2004, the cow calf manager livestock update, February extension animal scientist, Beef, VA Tech. 20 Proceedings 2004 Florida Dairy Reproduction Road Show.
- Kruip, T. AM., Meijer, G.A.L., Rukkwamsuk, T. and Wensing, T. (1999). Investigation into the mechanisms of reduction in fertility of high yielding cows. Production Diseases in Farm Animals. 10th Int. Conf. 1999, 183-190.
- Looper, M L., Lents, C.A., Wettermann, R.P. (2003). Body condition at parturition and postpartum weight changes do not influence in incidence of short lived corpora lutea. In postpartum beef cows. *J. Dairy Sci.*, **81**: 2390.
- Nebel, R.L., and McGilliard, M.C. (1993). Interaction of high milk yield and reproductive performance in dairy cows. *J. Dairy Sci.*, **76**(10): 3257-3268.
- Nishida, T., Kurihara, M., Terada, F., Purnomadi, A., and Shibata, M. (1999). Effect of energy level on plasma hormones and metabolites during the last two months of pregnancy in Holstein dairy cows. *J. Anim. Sci.*, **70**(8) J123- J131.
- Patten, M., Munnich, A., Lindemann, E. and Krockner, M. (1995). Relationship between fertility and milk yield in high yielding cows. *Tierarzt. Unischau.* **50**:12, 815-822.
- Pugashetti, B., Shivakumar, M.C., Kulkarni, V.S. and Chandrakala, G.K. (2009). Postpartum body weight changes in HF x Deoni cows. *Karnataka J. Agri. Sci.*, **22**(1): 250-251.
- Rao, A.V.N., Sreemannalayana, O. and Rao, H.R. (1996). Variation of body weight and lactational traits in relation to weight at calving in Murrah buffaloes. *Buff. Bull.* **115**(2): 45.
- Reksen, O., Grohn, Y.T.s Havreoli, O.S., Boestad, T., Waldmann, A. and Ropstad, F. (2001). Influence of concentrate allocation and energy balance on postpartum ovarian activity in Norwegian cattle. *J. Dairy Sci.*, **84**(5): 1060-1068.
- Tiwana, M.S., Dhillon, J.S., Vale, W.C. (ed), Barnbe, V.H. (ed) and Mattos, J.C.A de (1994). An appraisal of the performance of a Murrah buffalo breeding herd in India. Proc. 4th World Buff. Cong., Sao Paulo, Brazil, 27-30 June, 1994. Vol 2, 1994, 55-57.
- Vasilatos, R. and Wangness, P.J. (1981). Diurnal variation in plasma insulin and growth hormone associated with two stages of lactation in high producing cows. *Endocrinology.*, **108**:300.
- Youdan, P.G. and King, J.O.L. (1977). Effect of body weight changes on fertility during the postpartum period in dairy cows. *Br. Vet. J.*, **133**:635.