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Impact of weaning age on post-partum reproductive performance and stress level in Murrah buffaloes

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The weaning practice has been proved worthy and is well established in dairy cattle; but in spite of major contribution, the weaning in buffalo is not practiced due to fear of letdown problem caused by strong maternal instinct (Singh and Brar 2006). Weaning of buffalo calves at birth may also lead to difficulty in pail/bottle feeding due to strong maternal instinct in buffaloes. Various studies had also shown that first month of age is the most critical period for buffalo calf survival and performance (Rijasnaz 2011, Bharti *et al*. 2015). Therefore, alternatively buffalo calves can also be weaned at 45th days of age. Weaning during this period, dams may show more prompt estrous behavior due to coinciding with lack of natural suckling stimulus and completion of uterine involution after 45 days of calving (Hussein *et al*. 2013). Keeping in view these facts, the present study has been undertaken to see the effect of different age at weaning (at birth and 45th days) on post-partum reproductive performance and stress level in Murrah buffaloes.

The present study was conducted on Murrah buffaloes maintained at Cattle and Buffalo Farm of Indian Veterinary Research Institute (IVRI), Izatnagar, Bareilly, Uttar Pradesh from September 2011 to December 2012. The climatic condition of the experimental site touches both the extremes viz. cold (approximately 5ºC in winter) and hot (approximately 45ºC in summer). The relative humidity ranged between 15 and 85%. The annual rainfall ranged from 90 to 120 cm and most of which was received during the month of July to September. The adult animals were reared under loose housing system with provision of bedding materials during winter months. Animals were provided good quality chaffed green fodder (berseem, maize, jowar and oat), dry fodder (wheat straw) as per the requirement and seasonal availability. Heat detection in buffaloes was done by using teasure bull and further confirmed by ovarian palpation through rectal examination. Initially, 42 buffalo calf-dam pairs were randomly distributed into three groups (n=14/group); but due to few cases of weaning failures during the experimental period, the final number of calf-dam pairs studied in group 2 and group 3 were 11 and 10 respectively (n=35). In group 1 (suckling or control), all calves were allowed to suckle from their respective dams twice a day from birth to 90 days of age. In group 2 (0-day weaning), calves were weaned immediately after birth. Each calf was fed on colostrum of its own dam within few hours after birth and was given twice daily for first three days of age @ 10% of live body weight. From fourth day onwards, calves were reared artificially by pail feeding of whole milk till 90 days of age. The let down of milk in dams of group 2 was done by hand touching and massaging of teats by milkers while milking. In group 3 (Early weaning), calves were allowed to suckle from their respective dams for initial 44 days (similar to group 1) and thereafter they were weaned at 45th days of age and rest of the feeding protocol was similar to that of group 2. Reproductive parameters (number of days to express her first post-partum heat, days at first service or artificial insemination (AI), service period (days), number of AI per conception and lactation length) were recorded from calving to 90 days post-partum. Blood sampling was done after milking in morning hours every fortnight interval from calving to 90 days of lactation after proper restraining of animals and was analyzed for estimation of estrogen, progesterone and cortisol levels using commercial kits (Immunotech, France) by radioimmunoassay (RIA) technique. The standard statistical analytical procedures (Snedecor and Cochran 1994) were adopted and generated data under study was analyzed using SAS 9.2 version software.

The average days for onset of first postpartum estrus was observed earliest in dams of group 2 (49.12±7.37 days), followed by group 3 (58.80±12.17 days) and group 1 (66.00 ±11.61 days). However, the average days at resumption of first heat did not differ significantly among the groups. The average days of first AI after calving was lowest in

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group 2 (68.37±4.21 days) followed by group 3 (79.60±8.49 days) and group 1 (82.25±9.05 days). The average service period was maximum in group 1 (113.58±13.14 days) followed by group 2 (108.00±24.37 days) and group 3 (96.50±12.69 days). The longer service period in suckling dams might be due inhibition of ovarian activity due to longest suckling stimulus in this group as compared to weaned groups. In the present study, the average number of AI per conception in buffaloes was highest in group 1 (2.08±0.31) followed by group 2 (2.00 ± 0.32) and group 3 (1.70±0.30). The lowest number of AI per conception in dams of group 3 could be due to almost 50% of dams got conceived in first AI. The conception rate at first AI was highest in group 3 (50%) followed by group 1 and group 2 (41.67 and 37.50%, respectively), which may be because of synergistic effect of weaning as the dams did not get the suckling stimulus and further had lower milk production giving positive stimulus to ovary.

The first post partum estrus in suckled buffaloes was observed late which were more or less similar to those reported by Kantharaja (2011). The longer service period in suckling dams might be due inhibition of ovarian activity due to longest suckling stimulus in this group as compared to weaned groups (Kantharaja 2011). Similarly, Sikka *et al*. (2002) reported that in weaned buffalo's service period was reduced as compared to their suckling counterparts.

The mean serum estradiol level (pg/ml) of dams at fortnightly interval in different groups had shown fluctuating trend among the groups at various stages of sampling. However, it was initially higher on the day of calving and decreased continuously up to day–45 and reached maximum on the day-60. It had again decreasing trends from day-60 to 90 day. The serum estradiol level was significantly ($P<0.05$) higher in group 1 (30.13±3.09 pg/ml) than group 2 and group 3 (19.48±2.34 and 24.58± 3.95 pg/ml, respectively) at day-90 of post calving, which indicated that most of buffaloes in suckled group were in follicular phase of ovarian cycle with behavioral signs of estrus. In the present study, the mean serum progesterone level (ng/ml) of dams at fortnightly interval had also fluctuating trend among the groups at various stages of sampling. Initially, serum progesterone concentration was lower on the day of calving and increased continuously and reached to its maximum level at day-90 after calving. Although the progesterone level was non-significant among the groups at all sampling stages, it was highest in group 3 (4.90±1.22 ng/ml) than group 2 and group1 (3.87±0.76 and 4.01±0.86 ng/ml, respectively) at day-90 of post calving. The higher serum progesterone in group 3 than group 1 and 2 might be a result of higher proportion of dams conceived.The mean serum estradiol level of dams in the present study was in agreement with Rijasnaz (2011) who reported that the mean serum estradiol differed significantly ($P<0.05$) between the weaning and suckling groups until 43 days post-calving. The serum progesterone level of dams had also fluctuating trend among the groups at various stages of sampling as reported by Rijasnaz (2011). However, regression of the corpus luteum after calving expressed by progesterone concentration on day 3 postpartum was not different in milked and suckled buffaloes (Arya and Madan 2001).

The serum cortisol had fluctuating trend among the groups at various stages of sampling. It initially increased from day of calving to first fortnight in all groups and thereafter it increased in group 1 and group 3 whereas it decreased in group 2 (day-30).

The mean serum cortisol level also exhibited the same trend. However, serum cortisol level was not significantly different among the groups at any stage of sampling in dams but it was higher in group 3 than group 1 and group 2 from day-45 till day-90, which might be due to continuous weaning stress from day of weaning due to social disruption of established dam-calf relationship (Gudev *et al*. 2007). Blanco *et al*. (2009) reported that cortisol concentration increased after weaning, irrespective of age at weaning.

SUMMARY

The present study was conducted to see the impact of weaning ages on post-partum reproductive performance and stress level in buffaloes. Murrah buffaloes (42) were equally and randomly divided into three groups viz. group 1, suckling (control); group 2, Weaning of calves at birth and group 3, Weaning of calves at 45^{th} day. Reproductive parameters were recorded from calving to 90 days post-partum. The average days of first post-partum heat and first post-partum artificial insemination (AI) were earlier in dams of group 2 than group 3 and group 1. However, the number of service per conception and first service conception rate were better in group 3 than group 2 and group 1. Keeping in view the early resumption of ovarian activity and better reproductive performance in weaned buffaloes, the weaning practice could be more successful at earliest possible time after calving (at birth).

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