EFFECTS OF SUCKLING VERSUS WEANING ON PERFORMANCE OF PRIMIPAROUS GIR (*Bos indicus*) COWS AND ON GROWTH RATE OF THEIR CALVES

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ABSTRACT

Weaning is generally practiced in dairy and beef cattle for achieving better growth rates by giving balance feed in foreign countries. In indigenous dairy cattle it is necessary to evaluate the effect of weaning and suckling on calf growth parameters and reproductive performance of dams. Fifty eight primiparous Gir cows and their calves were taken in to consideration for the study of these two managemental system including disease resistance and its effect on milk yield and lactation length. Significant differences (P <0.05) were observed in average daily weight gain (0.320±0.011 vs 0.440±0.011 g), weekly body weight gain (2.21±0.080 vs 3.09±0.78 kg) and total weight gain after 3 months of study period (28.70±1.036 vs 40.18±1.019 kg) in favour of calves that sucked their dams. Among two groups of cows, lower incidence of mastitis was recorded in suckled as compared to weaned group of cows and diarrhoea was a less frequent problem in calves of suckling system. By suckling in Gir cows significantly more milk (1540.51±135.69 lit) could be harvested as compared to weaning group (992.27±257.57 lit). However, five cows in weaned group also attained exceptionally higher milk yield with greater lactation days. The mean calving interval (501.83±18.38 vs 407.90±16.89 days) and lactation length (338.03±23.45 vs 210.19±36.823 days) were significantly higher in suckled than the weaned cows. Therefore, it is necessary to evaluate these two managemental systems thoroughly for the economics of milk production and calf raising in indigenous primiparous Gir cows.

KEY WORDS: Gir cattle, Primiparous, Suckling, Weaning, Disease resistance, calf growth, Reproductive performance

INTRODUCTION

Maternal behavior, interaction and contact between cow and calf are limited or absent in modern dairy production due to adoption of artificial calf rearing (weaning) especially in crossbred/exotic cattle. Introduction of suckling on a dairy farm has positive effects on many aspects such as calf growth, animal health, milk production, rearing costs, behavior, welfare and naturalness (Jos langhout, 2003). Cattle in developing countries are mainly of dual purpose, i.e. milk production and draught purpose (Preston and Murgueitio, 1992). Weaning is generally practiced in dairy and beef cattle for achieving better growth rates by giving balance feed in foreign countries. In indigenous dairy cattle it is necessary to evaluate the effect of weaning on calf growth, disease resistance and its effect on milk yield and duration of dam's lactation. It is expected that first calf heifers should have less stress of nursing and raising of a calf. As a result, they should recycle and breed back earlier and grow more rapidly (Froberg and Lidfors, 2009).

Long term suckling without additional milking in early lactation in some situations can stimulate subsequent milk production to greater extent than milking alone. Suckling decreases the risk of mastitis.The principle of early weaning is to provide acceptable amount of dry feed which the calf would consume as early as 4 days of age. Rumen is thereby stimulated for growth and activities and by the time the calf is 3 weeks old, the rumen is functioning earlier than under normal condition.

On the other hand, early weaning has led to more instances of illness, mainly scouring, loss of appetite and calf mortality. Information on the effects of suckling system over weaning on body weight gain, milk production, calving intervaland health status of calves and udder health of dam in indigenous dairy breed like Gir is meager, hence this study was planned to evaluate and compare these aspects in suckled and weaned primiparous Gir cows.

MATERIALS AND METHODS

The study was conducted as an on-farm trial on Gir cows from 2009 to 2013. Two calf rearing systems, viz., weaning and suckling were compared at Cattle Breeding Farm, Junagadh, Gujarat. Newly born calves were alternately allocated to one of the rearing groups. Total number of calves under study was 26 in weaning group and 32 in suckling group. The approximate average annual milk production of the herds was 2,400 kg/cow/lactation.

Management and Feeding:

Immediately after parturition, within half to one hour colostrum was fed to each newborn calf. In suckling group, the calves were kept together with their dams for three days and under weaning method of rearing, the calves were separated from their dams immediately after parturition. In suckling group, calf was allowed to suckle for first few minutes during morning and evening milking for stimulation of milk-let down and then cows were milked with their calves tethered next to their heads. After milking, the calves under suckling group had access to suckle the residual milk and an un-milked udder quarter. The calves under weaning system received warm whole milk per day @ 10% of body weight in divided dose after 2-3 days of colostrum feeding. During 2nd and 3rd month calves received warm milk @5% of their body weight. From third week onwards, along with milk concentrate (cotton seed cake and Amul pellet), dry and green fodder were provided to both the groups of calves in group feeding; however, calves of both the groups were kept separately during the entire period of study. Rest of feeding schedule was similar for both the group of animals.

The cows under both the treatments were stall fed and were hand milked twice daily at 4:00 AM and 4:00 PM. Each cow was fed approximately 40-45 kg of mixed chaffed green (sorghum/maize/cowpea/sunflower according to season and availability) and dry fodder (hay/grass) daily distributed in two feeds at 10.30 hr and 15.00 hr. A concentrate mixture (cotton seed cake, Amul pellet feed and mineral mixture) was given at the rate of 5 kg/head daily at the time of milking for the first 4 days after calving and subsequently at the rate of 400 g/kg of milk produced by the cow. Additionally 1.250 kg of concentrate mixture was given for their maintenance.

Measurement of Body Weight:

The calves under both the treatments were weighed weekly before and after suckling in order to determine their milk consumption and at the same time serve as a check on their growth rate. Milk recorded was on a daily basis. Cows were weighed immediately after calving and at the end of 3 months trial (i.e. weaning time). Breeding of cows was done through AI on observed estrus. The data was analyzed using unpaired ‘t’ test.

RESULTS AND DISCUSSION

Weight Gain and Performance of the Calf:

Significant differences (P>0.05) were recorded in average daily gain, weekly body weight gain and total weight gain after 3 months of study period in favour of calves that sucked their dams (Table 1). Initially the growth rates were at par in both the treatments, but from the 2nd and 3rd week and the differences were pronounced in favour of suckling group throughout the-trial. Higher rates of weight gain and better milk conversion per unit weight gain of the suckled calves observed in the present study could be related to the higher fat content in the milk consumed compared to the milk consumed by weaned calves and also to the advantageous response of digestive tract

of young calves when they suckle directly to their dam. When calves suckle naturally, milk is channeled by the reticular groove reflex directly to the abomasum, which is the true stomach of a newborn calf. Both the energy and protein are utilized with considerably greater efficiency than if the milk had passed first into the rumen. When drinking milk from a bucket, it is probable that a part of the milk enters rumen.

Wagenaar and Langhout (2007) reported that suckling up to 3 month of age had a positive effect on calf growth as compared to bucket fed calves. Suckling calves reached earlier a live weight of 100 kg and could be weaned sooner than bucket fed calves. Gaya *et al. (1977) recorded* double growth rate in suckled calves ($P < 0.001$) than that of weaned calves. Ugarte and Preston (1972) reported that calves suckled twice daily grew at a higher rate (0.86 vs 0.60 kg/day) and had a higher weaning weight (102 vs 82 kg) than calves suckled once daily. Kisac *et al. (2011) reported* that during the period from birth to weaning, calves suckled for 7 days attained significantly lower body weight and daily weight gain than the calves suckled for 21 days. Alvarez *et al.* (1980) and Velazco *et al.* (1983) demonstrated that growth rates of calves and conversion of milk into live weight gain were improved when calves were reared by restricted suckling rather than with milk from a bucket.

Table 1: Weight gain in Gir calves under weaning and suckling system of calf raising

Management observations recorded	Treatment groups	
	Weaning (n=26)	**Suckling (n=32)**
Initial live birth weight (kg)	19.80 ± 0.58	21.31 ± 0.56
Final weight at 3 months (kg)**	48.50 ± 1.28	61.48 ± 1.31
Total weight gain up to 3 month (kg)**	28.70 ± 1.04	40.18 ± 1.02
Average weekly wt gain up to 3 month (kg)**	2.21 ± 0.08	3.09 ± 0.78
Average daily live wt gain up to 3 month(kg)**	0.32±0.01	0.44 ± 0.01

** *P <0.05 between groups*

Health of Calves and Udder of Cow:

Disease resistance in both the groups of calves was studied. Diarrhoea, an important cause of mortality in conventional calf rearing was found to be a less frequent problem in suckling system. Out of 32 calves born to the cows of suckling group, 3 calves suffered from diarrhoea, one showed respiratory problem and 1 calf was weak and debilitated. Among the 26 calves raised under weaning system, 7 suffered from diarrhoea, 2 had respiratory problem, 2 calves were weak and emaciated and 1 showed skin lesion during the period of 3 months study. However, diarrhoea did not result in mortality in any group. This was due to proper veterinary care the calves received during the period of study. Out of 26 cows under weaned group, 4 cows suffered from mastitis during the 3 months study period, while only 2 cows out of 32 cows of suckling group suffered from clinical mastitis. Rearing dairy calves by restricted suckling has been shown to result in higher total milk yield and lower incidence of mastitis in the dams as compared to artificial rearing (Ugarte and Preston, 1972; Gaya *et al.,* 1977). Wagenaar and Langhout (2007) reported that diarrhoea was a less frequent problem in suckling systems. Sofie Froberg (2008) reported improved udder health of the restricted suckling in comparison to the artificial rearing cows as indicated by the lower CMT scores.

Suckling seems to be advantageous for udder health regardless of the length of the suckling period

(Krohn, 2001) or whether the cows are of Zebu or dairy breeds (Knowles and Edwards, 1983; Mejia *et al.,* 1998; Everitt and Phillips, 1971; Rigby *et al.,*1976). The beneficial effects on udder health have been attributed to mechanical factors in the suckling (Rigby *et al.,* 1976), a better udder emptying and antibacterial substances in the calf's saliva (Rigby *et al.,* 1976; Mejia *et al.,* 1998).

Milk production and Calving interval of cow:

Significant (P <0.05) differences were observed in calving interval and lactation days of cows; the values for cows under weaning group were found lesser as compared to suckling group (Table 2). All the suckling group of cows produced on an average 1540.51 ±135.69 lit of milk in 338.03±23.45 days. However, among cows under weaning group, average milk production during entire lactation were 992.7±257.57 lit. in 210.19± 36.82 days. Exceptionally under weaning group, 5 cows produced high quantity of milk (3212.28 lit. in 477.60 days of lactation and the rest of the 21 cows produced only 463.69 lit. in 146.52 days. Looking to the milk production data there could be some maternal instinct (interaction and contact) between cow and calf that may play an important role in high quantity of milk production and lactation length as compared to artificial calf rearing, but five cows under weaning group also produced exceptionally well. Hence, high production in suckling group of cows whether may be due to maternal instinct or any other factors that positively influence is still the matter of investigation in indigenous cows. Contrary to present finding, higher milk production in non-suckled cows as compared to suckled ones has been documented in exotic breeds (Wagenaar and Langhout, 2007).

Several studies reported that restricted suckling increases milk production in *Bos indicus* cattle and their crosses (Knowles and Edwards, 1983; Mejia *et al.,* 1998) and in pure Holstein cattle (Everitt and Philips, 1971; Bar-Peled *et al.,* 1995) as compared to artificial rearing. Milk production is believed to be enhanced through teat stimulation by the calf (Bar-Peled *et al.,* 1995), a more efficient udder emptying when the calf suckles after milking (Sandoval-Castro *et al.,* 2000) and improved udder health when cows are suckled (Preston, 1984; Mejia *et al.,* 1998). Moreover, it has been shown that more frequent udder emptying in early lactation is beneficial for the development of the milk secreting cells (Hale *et al.,* 2003).

Table 2: Lactation length, milk production and calving interval of primiparous Gir cows under weaning and suckling system of calf raising

Management observation recorded	Treatment groups	
	Weaning (n)	**Suckling (n)**
Average milk production up to 3 months (lit.)	313.66 ± 61.99(26)	637.80 ± 33.29(32)
Average milk production during entire lactation (lit.)	992.27 ± 257.57(26)	1540.51±135.69(32)
Lactation length (days)	210.19 ±36.82 (20)**	338.03± 23.45 (30)
Calving interval (days)	407.90 ± 16.89 (26)**	501.83± 18.38 (32)

***significant at P <0.05 between groups*

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