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## Study of calf rearing and welfare management practices in urban and periurban dairy farms

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### Abstract

The required information pertaining to calf rearing was collected by personal interview from 20 each dairy farm locates in urban and peri urban area. The collected data were tabulated and analyzed for frequency and chi square test. About (72.5 %) of the respondents attended calving day & night and 15 per cent practiced ligation/ cutting and disinfection of the navel cord. All the respondents fed colostrum to new born calf and more than half of the respondent fed within one hour. Only 40% farmers practiced weaning of calves and 40 per cent regularly followed deworming of calves. No one provided bedding material to calves. The welfare aspects in both regions were studied by selecting 20% animals from all 40 farms, randomly. Selected animals were scored as per standard practice by one researcher. The welfare indicators studied were subjected to statistical analysis. It was found that shed floor cleanliness score was around 2.30, whereas farm stead premises score was 2.35 and water trough score was 2.15. Average animal hygienic score was 2.24, lameness scoring was 1.36 and hock & knee injury score was 1.03 in urban and peri urban region.

**Keywords:** Calf rearing, cleanliness score, hygiene score, ligation, naval ill

### Introduction

The calf rearing is science and art. Calves required proper management and constant attention because they are future of dairy farms. Calf mortality acts as one of the major obstacles and 20% calf mortality reduces net profit to approximately 40%, further, calf mortality ranges from 12.5 to 30% in Indian condition (Singh *et al.*, 2009) <sup>[11]</sup>. Sometimes it may be even as high as 81% (Tiwari *et al.*, 2007) <sup>[15]</sup>. Organized farm is also having calf mortality ranging from 5-10%. For calves first 5 days and one month is very crucial as far as mortality concern. Patel *et al.* (2017) <sup>[8]</sup> reported highest mortality in Surti buffalo calves in the age group below one month. Therefore, calf management should focus more during first month of life. The various national as well as international institutions like FAO, NDDB, NDRI has demonstrated good calf rearing practices to guide dairy farmers. They have demonstrated detail procedure of ligation of naval cord, nursing, preparation of calf starter etc in booklet form. Milk quality is important factor in dairying which depends on the animal cleanliness and farm cleanliness. Quality of milk and knowledge of hygiene and sanitation of farms is important role in food chain (Surkar *et al.*, 2014) <sup>[14]</sup>. The presence of dispersed dirt in the floor may be a cause for the contamination of teats and milk with dirt. Improving hygiene of the surface area and to keep the udder clean reduce the occurrence of environmental mastitis. For having good hygiene concrete flooring is popular amongst dairy farmers in India due to their durability and convenience in cleaning. However, due to hard and solid consistency it cannot provide comfort necessities for standing, walking and lying (Phillips and Morris, 2001) <sup>[9]</sup>. It may cause injuries to animals also. Hence an effort made to know the calf management practices along with dairy farm hygiene scoring and various type scoring in dairy animal at Navsari district of south Gujarat.

### Materials and Methods

Study was conducted in Navsari district of south Gujarat. The area fall in 8 km radius to Navsari was consider as urban area whereas, the areas falls in 16 km radius minus urban area was considered as peri-urban area. A list was prepared for all the commercial dairy farms which are having total herd strength at least 20 A.U. of either cattle or buffalo in urban and peri urban area. Twenty dairy farmers each from urban and peri urban who possessed 20 A.U were selected randomly. The pre tested interview schedule was used to collect primary information about calf rearing practices from the respondents through personal contact, developed through native individuals.

Welfare management practices were studied indirectly by certain indicators like hygiene score, hock and knee injury score, lameness score. Moreover, cleanliness among farmstead was studied by ranking of animal standing area, other areas of farmstead (road, store, manure storage area). Scoring for animals was judged in all dairy farms by selecting 20% animals as sample. Selected animals were scored for hygiene, lameness and hock and knee injury manually in morning hours between 9-11 am by researcher. Hygienic and lameness scoring of the animal shed was judged by researcher by using 1-4 score as per Sadharakiya *et al.* (2019) [10]. Score 1 stands for most clean and score 4 means very dirty. Hock and knee injury was also judged in all these sample animals by assigning 0, 1 and 2 score for hair loss, swelling and ulceration in skin of hock knee region. Cleanliness scoring in standing area in shed was judged in at least 3 randomly selected spots about 1 square meter size by assigning scores (1-clean, 2-mildly dirty, 3-moderately dirty, 4-very dirty). Similarly, overall cleanliness in farm premises was studied by scoring cleanliness of internal roads, manure area, dutchbarn store etc as per availability with farms. All such observations were averaged to derive overall farmstead cleanliness score. The water trough was also judged for cleanliness scoring by same scoring. Mean of scores assigned to different three locations for standing area and farmstead were worked. The value of score was used for statistical analysis. The score was given by one researcher at the time of research only one time. Collected data were scrutinized and tabulated into frequency, percentages; arithmetic mean standard error and analysis of variance following the methods suggested by Snedecor and Cochran (1994) [12].

## Results and discussion

### Calf rearing management practices

The future of dairy farm *i.e.* calves are also born during calving; hence, calving is a key element in livestock farming. Close observation of cattle in the last gestation period is essential to detect the onset of calving and therefore, to reduce neonatal losses (Sorathiya *et al.*, 2019) [13]. It is clear from the Table 1 that majority of respondents (72.5%) of both regions attended calving that occurred during day as well as in night. However, two farms in peri urban area were not attending calving. The present findings are encouraging than those

reported by Yadav *et al.* (2016) [17] who found that 70 per cent of the respondents attended their animals while calving. Ligation of naval cord is having prime importance to prevent naval abscess and joint ill in calves. Many cases on naval infection is also occurs in organized dairy farms (Patel *et al.*, 2017) [8]. But it looks that dairy farms of both regions were not much serious about ligation of naval cord as table showing that 85 percent of respondents did not practice ligation, cutting and disinfection of the naval cord and it was left to fall off itself naturally. This finding is supported by Khadda *et al.* (2017) [5] and Patbandha *et al.*, (2017) [7]. This much low adoption in said practice was probably due to lack of sincerity regarding importance of mentioned practices. The scientific recommendation of feeding colostrum to newborn calves within one hour of birth was being practiced by 55 per cent of the total respondents which might be due to the awareness regarding importance of timely colostrum feeding. Colostrum is the sole source of immunity to the new born calves; hence, more efforts are required to educate the farmers for timely feeding of colostrum. These findings are supported by Patbandha *et al.*, (2017) [7]. However, 22.5% are feeding of colostrum to calves after falling of placenta, of course it is superstition, shedding of placenta has not any effect on quality of colostrum. Majority of the (60 %) respondents did not practice weaning of calves. This finding is similar to Yadav *et al.* (2016) [17] who found that all the respondents did not practiced weaning of calves after birth. Only 22.5 percent of respondents practiced castration of male calves. The present findings are encouraging than those reported by Yadav *et al.* (2016) [17]. However, it is contradictory to result of Yankam and Bhanotra (2018) [18] who found adoption of castration in 97.50 per cent male calves. It might be due to the fact that only those farmers who kept the animals for work purpose followed this practice otherwise they disposed them as early as possible. Majority farms were practiced deworming to calves, however, only 40% respondents were followed it at regular interval. These findings are similar to the findings of Khadda *et al.* (2017) [5]. The present results are contradictory to Yankam and Bhanotra (2018) [18] who revealed that 45.83 per cent of the respondents followed deworming of calves. All the respondents did not provided any bedding materials to calves. The calves were kept in the concrete shed and there is no particular space for calves.

**Table 1:** Distribution of the dairy owners according to Calf rearing practices

S. No.	Practices	Urban		Peri urban		Over all		Chi square	
		N	%	n	%	n	%	Value	P
1	Attended calving								
	Only day	3	15	6	30	9	22.5	3.862	0.145
	Day & night	17	85	12	60	29	72.5		
	Not any care	0	0	2	10	2	5		
2	Practiced ligation/ cutting and disinfection of the navel cord								
	Yes	3	15	3	15	6	15	--	--
	No	17	85	17	85	34	85		
3	Feeding of colostrum to new born calf								
	Yes	20	100	20	100	40	100	0.00	1.00
4	Time of colostrum feeding after birth								
	Within one hour	12	60	10	50	22	55	1.293	0.524
	After one hour	3	15	6	30	9	22.5		
	After fell of placenta	5	25	4	20	9	22.5		
5	Weaning of calves								
	Yes	9	45	7	35	16	40	0.417	0.519
	No	11	55	13	65	24	60		
6	Castration of male calves								
	Yes	6	30	3	15	9	22.5	1.290	0.256

	No	14	70	17	85	31	77.5		
7	Deworming of calves								
	Regular	10	50	6	30	16	40	9.336	0.009
	Occasional	4	20	13	65	17	42.5		
	Not practiced	6	30	1	5	7	17.5		
8	Bedding materials provided to calves								
	Gunny bag	0	0	0	0	0	0	--	--
	Straw	0	0	0	0	0	0		
	Both	0	0	0	0	0	0		
	Nil	20	100	20	100	40	100		

**Welfare management practices**

**Animal shed cleanliness scoring**

Animal shed was used to clean by removing dung two times in days in both regions. However, some farms were used to clean floor by water at least once in week, where as some farms have not practice to wash the surface. Further, it was observed that, most of the farmers were use to clean the shed during 9-11 am and 5-7 pm after milking. The routine of shed cleaning was more or less similar between both regions, however, preciousness in cleaning was different from farm to farm. The data shown in the Table 2 indicated that average floor cleanliness in standing areas of dairy farms were 2.30±0.14, considered toward mild dirty i.e. medium cleanliness. It was statistically similar between two regions. Cleanliness score of farm stead premises in urban area was 2.30±0.19 and in peri urban area it was 2.40±0.15. Average farm stead premises in dairy farms were 2.35±0.12. The cleanliness in internal roads, manure area, store area looked to

be in medium category. Average water trough cleanness in dairy farms was also fall under medium category (2.15±0.15). Mean scores of various farmstead premises was considered toward mild dirty category, however, considered better. It was better than hygienic score reported by Islam *et al.* (2020) [3]. The reason behind adopting hygienic shed due to awareness of about hygienic practices. Majority of the farmers were clean their shed two times in a day and only few farmers clean their shed one time in a day. If the cleanliness score were bad it might be due to the not availability of labour at a time. Unhygienic shed is source of proliferation of pathogenic microorganism which may promotes mastitis and other diseases in animals. Islam *et al.* (2020) [3] shown that floor cleanliness showed a significant ( $p < 0.05$ ) or close to significant ( $p < 0.10$ ) relationship with lameness, hind limb cleanliness, udder cleanliness, body hair loss, respiratory problems, and mastitis.

**Table 2:** Cleanliness scoring (Mean ±S.E) of animal shed in commercial dairy farms

S. No.	Shed hygienic scoring	Urban (n=20)	Peri urban (n=20)	Total (n=40)	F value	p value
1	Floor cleanness scoring	2.15±0.21	2.45±0.18	2.30±0.14	1.159	0.288
2	Cleanliness score of Farm stead premises	2.30±0.19	2.40±0.15	2.35±0.12	0.165	0.687
3	Cleanliness score of water trough	2.20±0.14	2.10±0.27	2.15±0.15	0.109	0.744

**Animal welfare related scorings**

The animal welfare related scoring like hygienic scoring, lameness scoring and hock & knee injury scoring on the basis of location, species and type of animal is presented in the Table 3. The perusal of data presented in Table 3 revealed that overall mean of hygienic scoring was 2.24±0.06. It was non significant between two regions. The result is agreement with Devries *et al.* (2011) [2] and Kara *et al.* (2011) [4]. They found that cleanliness score nearly similar with this report in tied housing system on animal. The data indicated that hygienic scoring was similar for animal in both regions which may be due to the majority of the respondents were spraying water over their animal one time or both time in a day. The evaluation of body cleanliness may give some information on animal comfort as well as farm hygiene. It can also give some indication about farm people's attitudes and care for animals. It may also be important for the purpose of clean milk production. Due to busy schedule in farming and traditional culture they paid less attention to cleaning of animal. Lameness is a major welfare problem for dairy animals and indicates pain and discomfort. Mean of overall lameness scoring of sample animals was 1.36±0.03, considered as good side. Significant higher lameness score in peri urban region might be associated with more cattle in periurban area. The proportion of cattle in herd was about 30 and 43 % in urban and periurban area, respectively. This result was similar with Devries *et al.* (2011) [2] and Kara *et al.* (2011) [4]. Bergsten *et al.* (2015) [1] and Upadhyay *et al.* (2017) [16] found that mean lameness scoring of animal which kept in concrete floor (in covered feeding area) + Brick paved (in open area) was

1.60±0.11. The floor is an important part of the shed, and has a direct relation with lameness. This may be caused by several factors, such as unbalanced nutrition, flooring and the time spent standing. Hard flooring in the conventional housing system may be a predisposing factor for this condition. Hock and Knee health is an important indicator of cow comfort and the hardness and uniformity of the resting surface floor. Mean overall hock and knee injury scoring was 1.03±0.90. In urban area it was 1.08±0.88 and in peri urban area it was 0.98±0.80, the difference was nonsignificant. Animal were tied in shed most of the time so more exposure to the physical conditions that cause injuries. Lombard *et al.* (2010) [6] said that 77 per cent of the cows had score 1. It was evident from the Table 3 that the effect of species in various three welfare scores was nonsignificant. However, effect of class category of animals on various scoring was having significance. As per Table 3 mean of hygienic scoring in milch animal was 2.09±0.07 and in dry animal it was 2.59±0.12. It might be due to more biased care of milch animals than dry animals from farmer's side. Mean of lameness as well as hock-knee injury scoring was significantly higher in dry animals. It is general fact that milch animal have more lameness score, however, there is reverse trend in present study. It might be associated with better care of milch animals in shed itself whereas; dry animals were mostly sent for grazing which leads to more lameness scoring due to more travelling. This all value revealed that the respondents were giving more attention towards milking animal with regards to hygienic, lameness and hock& knee injury.

**Table 3:** Effect of species, location of farm and class of animals on animal welfare scoring

Animal welfare scoring according to according to location of the farms						
S. No.	Type of scoring in animal	Urban	Peri Urban	Overall	F value	p value
		Mean $\pm$ S.E				
1	Hygienic scoring	2.15 $\pm$ 0.08	2.32 $\pm$ 0.09	2.24 $\pm$ 0.06	1.808	0.180
2	Lameness scoring	1.28 $\pm$ 0.04	1.44 $\pm$ 0.05	1.36 $\pm$ 0.03	4.878	0.028
3	Hock& knee injury scoring	1.08 $\pm$ 0.88	0.98 $\pm$ 0.80	1.03 $\pm$ 0.90	0.508	0.477
Animal welfare scoring according to species of animal						
S. No.	Type of scoring in animal	Cattle	Buffalo	Total	F value	p value
1	Hygienic scoring	2.19 $\pm$ 0.09	2.27 $\pm$ 0.08	2.24 $\pm$ 0.06	0.489	0.485
2	Lameness scoring	1.38 $\pm$ 0.05	1.35 $\pm$ 0.05	1.36 $\pm$ 0.03	0.255	0.614
3	Hock& knee injury scoring	1.14 $\pm$ 0.11	0.95 $\pm$ 0.09	1.03 $\pm$ 0.07	1.982	0.161
Animal welfare scoring according to class of animal						
S. No.	Type of scoring in animal	In milk	Dry	Total	F value	p value
1	Hygienic scoring	2.09 $\pm$ 0.07	2.59 $\pm$ 0.12	2.24 $\pm$ 0.06	14.579	0.00
2	Lameness scoring	1.29 $\pm$ 0.04	1.54 $\pm$ 0.07	1.36 $\pm$ 0.03	9.981	0.002
3	Hock& knee injury scoring	0.89 $\pm$ 0.07	1.36 $\pm$ 0.13	1.03 $\pm$ 0.08	10.638	0.001

### Conclusion

Most of the farmers were taking care of down calvers during day and night. However, they did not follow good practice of cutting/ligation of naval cord. All the respondents practiced colostrum feeding and most of fed within one hour of birth. Majority of the farmers did not followed weaning of calves and castration of male calves. Shed cleanliness score and animal hygiene scores revealed that studied farms was cleaner and hygienic. The quality of floor used in both farms was better as lameness and hock & knee injury score was lower in studied animals.

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