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Study of the milking practices in hand milking and community machine milking systems

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Abstract

The present study was carried out to compare the milking practices associated with two milking systems—hand milking system (HMS) and community machine milking system (CMS) in the jurisdiction of the Kolar-Chikkaballapura Milk Union Ltd. The milking practices of 72 randomly selected respondents from six villages of Kolar and Chikkaballapur districts were recorded. A significantly higher proportion of CMS respondents practiced milking in shed and used scientific milking pails as compared to HMS respondents. The common milking practices followed in both systems was using of wet utensils for milking and using ordinary water for washing the milking utensil prior to milking. All the respondents practiced washing hands, udder and teats prior to milking; and milking twice daily. During milking, a significantly higher proportion of CMS respondents practiced tying the tail, fore-stripping and stripping at the end of milking in CMS. In both milking systems, healthy animals were milked first and none of the respondents practiced any test for detection of mastitis. After the milking process was complete, significantly higher proportion of CMS respondents practiced cleaning the milking utensils with hot water and detergent. None practiced post-milking teat dips or wiped the udder and teats after milking. Though most of the respondents were not following scientific milking practices in both milking systems, the level of adoption was much higher in CMS as compared to HMS.

Keywords: Community machine milking, hand milking, milking practices, crossbred cows

Introduction

As per the estimates of National Accounts Statistics of 2020 for sector wise Gross Value Added (GVA) of agriculture and allied sectors, the contribution of livestock in total agriculture and allied sector GVA has increased from 24.32 percent (2014-15) to 29.35 percent (2019-20). The livestock sector contributed 4.35 percent of total GVA in 2019-20. Milk is the single largest agricultural commodity contributing 5 percent of the national economy and employing more than 8 crore farmers directly. Milking operation is the major activity of every dairy farm affecting the quantity, quality and the cost of the milk produced. Good milking practices enhance productivity, assist in keeping teat and udder in healthier condition and contribute significantly in clean milk production (Sabapara *et al.*, 2015) [6]. Hand milking is the common milking method in our country, with almost 90 percent of dairy animals being milked by hand. It has been reported that milking is a labour-intensive task and requires over half of the annual labour inputs on well-managed dairy farms (Taylor *et al.*, 2009) [7].

The Karnataka Milk Federation is giving greater emphasis on procuring quality milk from Dairy Cooperative Societies (DCS) under the concept of “quality excellence from cow to consumer.” Many Clean Milk Production (CMP) initiatives have been implemented at different stages of procurement, processing and marketing. Among these CMP initiatives, noteworthy initiative is the setting up of Community Milking Parlours in some of the Milk Producers’ Cooperative Societies (MPCS) on pilot basis (Mohan Kumar *et al.*, 2015) [4]. The Kolar-Chikkaballapura District Co-operative Milk Producers’ Union Ltd. (KOMUL) has started installing ‘Community Milking Machines’ on a pilot basis at the Society level from the year 2001 onwards to get the quality milk required for ultra-high temperature (UHT) milk processing at Kolar dairy under the brand name of ‘Nandini Good Life’.

Clean milk production results in milk that is safe for human consumption, is free from disease-

producing microorganisms, has a better keeping quality, thus yielding a product with high commercial value which is suitable for further processing. With the ever-increasing cost of agricultural labour, it has become imperative to mechanize various aspects of dairy farming; the most important being hand-milking operations which involve the most skill and drudgery. Small-scale alternatives to hand-milking, though popular, have associated drawbacks in the form of purchase cost of milking machine, time and money required for daily and periodic maintenance, irregular supply of spares, lack of timely repair in case of breakdown, investment in backup power systems, high operating costs etc. This study aims to compare the milking practices of dairy farmers practicing two different milking systems – hand milking and community machine milking.

Materials and Methods

The study was carried out in the jurisdiction of the Kolar-Chikkaballapura Milk Union Ltd. (KOMUL), Karnataka. Kolar District is situated at 13.1770°N Longitude, 78.2020°E Latitude, at an altitude of 849 metres (2,785 ft) above the mean sea level, and Chikkaballapura District is situated at 13.5229° N Longitude, 77.8367° E Latitude, at an altitude of 915 m (3,002 ft) above the mean sea level. Kolar and Chikkaballapura districts consist of 119 and 56 community milking machine parlours, respectively. In order to compare the efficiency of different milking systems, 3 villages having functioning community milking stations were randomly selected from each district, giving a total of 6 villages. In each village, 12 dairy farmers, 6 using hand milking system and 6 using community milking system, were randomly selected for the study. Overall, the milking practices of 72 respondents were recorded.

Relevant variables to study the milking practices were selected based on the pilot survey conducted in a non-sampling area and discussion with experts. This formed the basis for developing the schedule of enquiry, which was pre-tested; and appropriate modifications in the construction and sequence of questions were made. The structured and pre-tested interview schedule was filled on the spot by personal observations and face-to-face interview with dairy farmers. Details of existing practices followed by the dairy farmers before, during and after milking were recorded.

The data pertaining to various parameters was compiled and analyzed using Microsoft Excel 2016 software. Frequency and summary statistics was calculated to identify the predominant milking practices. Comparison of numerical data was done using ANOVA and that of ordinal data using the Chi square test.

Results and Discussion

Before Milking: The milking practices followed by dairy farmers under hand and community milking systems before milking are presented in Table 1. A large proportion of the respondents practiced milking in the shed (97.2 percent) in CMS as compared to HMS (19.4 percent), whereas majority of respondents followed milking in separate and dry place (80.6 percent) in HMS. These findings were in agreement with Mohankumar (2015)^[4] who reported that 100 percent of the societies of CMS carried out milking inside the animal shed. Majority of the respondents rinsed milking utensils before milking in HMS (94.4 percent) and CMS (91.7 percent). These findings are in line with Bashir and Vinod (2013)^[1] and Mohankumar (2015)^[4]. A majority of the respondents used ordinary water (95.3 percent) compared to

warm water (4.7 percent) in HMS, whereas all respondents use ordinary water in CMS, these findings were in agreement with Mohankumar (2015)^[4] who reported that all farmers cleaned the milking utensils using tank water; similar findings were reported by Bashir and Vinod (2013)^[1]. All respondents were found to wash their hands, and the cow's udder and teats before milking. These findings were in line with Patel *et al.* (2014)^[5], Mohankumar (2015)^[4] and Kumar *et al.* (2014) who reported that 87.0 percent farmers washed their hands prior to milking. All respondents practiced milking twice a day; similar findings were reported by Bashir and Vinod (2013)^[1], Patel *et al.* (2014)^[5] and Mohankumar (2015). Most of the respondents used open mouth bucket (69.4 percent) as compared to scientific milking pail (30.6 percent) in HMS.

During Milking: The milking practices followed by dairy farmers under hand and community milking systems during milking are presented in Table 2. A large proportion of the HMS respondents followed milking in healthy animals first (91.7 percent) rather than randomly (8.3 percent). In CMS, all respondents followed milking in healthy animals first. These results were in agreement with Mohankumar (2015) who reported that a majority of the respondents practicing hand milking (78.34 percent) and machine milking (68.34 percent) were milking healthy animals first. Majority of the respondents tied animal's tail during milking in HMS (61.1%) and CMS (97.2%), these findings were in contrast to Mohankumar (2015) who reported that majority of the respondents of hand milking and machine milking systems (61 percent and 75 percent, respectively) were not having the awareness about tying the tail of animals during milking. Most of the respondents (61.1 percent) did not follow dry hand milking; these findings are in agreement with Kumar *et al.* (2014)^[3] who reported that a smaller number of farmers (40 percent) milked their animals by dry hand.

None of the HMS respondents practiced fore-stripping during milking, whereas 41.7 percent CMS respondents practiced it. These results are in agreement with Jacob and George (2013)^[2] who reported that only 10 percent of the farmers responded correctly for checking the first strip of milk for any abnormality. None of the respondents carried out any test for detection of mastitis in HMS and CMS; similar findings were reported by Patel *et al.* (2014)^[5] and Mohankumar (2015)^[4]. Majority of the respondents in HMS fed concentrates (83.3 percent) for milk let-down, while some respondents tied calf near cow (16.7 percent); all the respondents practiced udder massage for milk let-down. These results were in agreement with Mohankumar (2015)^[4] who reported that all dairy farmers in machine milking system practiced teat manipulation for let-down of milk. In contrast, Bashir and Vinod (2013)^[1] reported that while 68.33 percent of farmers practiced udder massaging and feeding concentrate for let-down of milk, only 31.66 percent were practiced calf suckle reflex for let-down of the milk. Kumar *et al.* (2014)^[3] also reported that for let-down of milk about 67.92 percent farmers allowed the calves for suckling.

Most of the respondents followed full hand (63.9 percent) milking method, while a large group of the respondents practiced knuckling (36.1 percent) and none followed stripping method in HMS. These findings were in line with Bashir and Vinod (2013)^[1] who reported that 73.33 percent of farmers practiced full hand method and 18.33 percent followed knuckling. In contrast, Kumar *et al.* (2014)^[3] reported that majority of the farmers practiced knuckling (64.17 percent) followed by full hand (28.75 percent) and

stripping (7.08 percent). None of the HMS respondents followed stripping at the end of the milking; however, most of the CMS respondents followed stripping (94.4 percent). These findings were in agreement with Mohankumar (2015) ^[4]; however, Kumar *et al.* (2014) ^[3] reported that only 70 percent farmers followed stripping at the end of the milking.

After Milking: None of the HMS respondents washed udder and teats after milking, while 91.7 percent of the CMS respondents practiced it. These findings are in contrast with Mohankumar (2015) ^[4] who reported that half of the farmers of machine milking system washed the udder after milking. None of the respondents in either milking system wiped udder and teats after milking. In contrast, Kumar *et al.* (2014) ^[3] reported that 56.67 percent farmers wiped the udder and teats after milking. None of the respondents practiced teat dipping after milking in both HMS and CMS. These findings are in

agreement with Mohankumar (2015) ^[4], Kumar *et al.* (2014) ^[3] and Jacob and George (2013) ^[2].

All respondents regularly cleaned the milking utensils after milking in both milking systems. Majority of the HMS respondents used ordinary water and detergent (88.9 percent) as compared to hot water and detergent (11.1 percent) for cleaning milking utensils. These findings are in agreement with Patel *et al.* (2014) ^[5] who reported that most farmers used tap water for cleaning of milking utensils. Similar findings were reported by Mohankumar (2015) ^[4]. Most of the HMS respondents followed calf weaning at day old (58.3 percent), 5 day (5.6 percent) and more than 5 days (36.1 percent) in HMS, while majority of the CMS respondents followed calf weaning at day old (91.7 percent), 5 day (2.8 percent), more than 5 days (5.6 percent). In contrast, Yadav *et al.* (2016) ^[8] reported that none of the respondents adopted weaning system for their calves just after its birth, while 66.4 percent respondents weaned their calves at the age of 3 months.

Table 1: Milking practices followed before milking by dairy farmers practicing hand milking and community machine milking in Karnataka.

Sl. No.	Attribute	N	Milking system (%)			P value
			HMS	CMS	Overall	
	Milking location					0.000
	Milking in the shed	42	19.4	97.2	58.3	
	Separate and dry place	30	80.6	2.8	41.7	
	Condition of milking utensil					0.643
	Dry	5	5.6	8.3	6.9	
	Wet	67	94.4	91.7	93.1	
	Washing hands before milking					
	Yes	72	100	100	100	
	No	0	0	0	0	
	Washing udder and teats					
	Yes	72	100	100	100	
	No	0	0	0	0	
	Udder washing agent					0.151
	Ordinary water	70	94.4	100	97.2	
	Lukewarm water	2	5.6	0	2.8	
	Udder disinfectant	0	0	0	0	
	Frequency of milking					
	Twice daily	72	100	100	100	
	Thrice daily	0	0	0	0	
	Type of milking pail					0.000
	Open mouth bucket	25	69.4	0	34.7	
	Scientific milking pail	47	30.6	100	65.3	

Table 2: Milking practices followed during milking by dairy farmers practicing hand milking and community machine milking in Karnataka.

Sl. No.	Attribute	N	Milking system (%)			P value
			HMS	CMS	Overall	
	Pattern of milking the cows					0.077
	Healthy animals first	69	91.7	100	95.8	
	Randomly	3	8.3	0	4.2	
	Sick animals first	0	0	0	0	
	Tying animal's tail during milking					0.000
	Yes	57	61.1	97.2	79.2	
	No	15	38.9	2.8	20.8	
	Dry hand milking					0.006
	Yes	18	38.9	0	25.0	
	No	54	61.1	100	75.0	
	Fore-stripping of milk					0.000
	Yes	15	0	41.7	20.8	
	No	57	100	58.3	79.2	
	Test for mastitis detection					
	Yes	0	0	0	0	
	No	72	100	100	100	
	Milk let-down technique					0.000
	Allow calf to suckle	0	0	0	0	
	Tying calf near cow	6	16.7	0	8.3	

	Feeding concentrates	30	83.3	0	41.7	
	Udder massage	36	100.0	100.0	100.0	
	Milking method					0.000
	Full hand	23	63.9	0	31.9	
	Knuckling	13	36.1	0	18.1	
	Stripping	0	0	0	0	
	Machine milking	36	0	100.0	50.0	
	Stripping at the end of milking					0.000
	Yes	34	0	94.4	47.2	
	No	38	100.0	5.6	52.8	

Table 3: Milking practices followed after milking by dairy farmers practicing hand milking and community machine milking in Karnataka.

Sl. No.	Attribute	N	Milking system (%)			P value
			HMS	CMS	Overall	
	Washing udder and teats					0.077
	Yes	3	0	8.3	4.2	
	No	69	100	91.7	95.8	
	Wiping udder and teats					
	Yes	0	0	0	0	
	No	72	100	100	100	
	Teat dipping					
	Yes	0	0	0	0	
	No	72	100	100	100	
	Regular cleaning of milk utensils					
	Yes	72	100	100	100	
	No	0	0	0	0	
	Milking utensil cleansing agent					0.000
	Ordinary water + Detergent	32	88.9	0	44.4	
	Hot water + Detergent	40	11.1	100.0	55.6	
	Weaning of calf					0.004
	Day old	54	58.3	91.7	75.0	
	5 days	3	5.6	2.8	4.2	
	More than 5 days	15	36.1	5.6	20.8	

Conclusion

Based on the findings of the present study, it can be concluded that though most of the respondents were not following scientific milking practices in both milking systems, the level of adoption was much higher in CMS as compared to HMS.

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