The Pharma Innovation Journal 2020; SP-9(4): 144-148

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2020; SP-9(4): 144-148

www.thepharmajournal.com
Received: 05-02-2020
Accepted: 08-03-2020

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Dairy husbandry practices by women dairy farmers in Sabarkantha district of Gujarat

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DOI: https://doi.org/10.22271/tpi.2020.v9.i4Sd.4741

Abstract
Prevailed status of women dairy farmers in Sabarkantha district of Gujarat was studied by selecting 150 women farmers randomly covering all talukas. Desired information was collected by questionnaire was analyzed in SPSS 26 software. Majority of women were belonged to midlife age. Significant higher numbers of women was lived in nuclear family (73.9%) in pakka houses. Majority of women were rearing 3 animals by mixed farming system along with agriculture. As majority was holding 2.4-6 acre land with open well irrigation facility. Majority were bathing (23%) and washing teats (91%) before milking. Few were using teat dip cups before and after milking. Knuckling method of milking was employed by majority of respondents (57%). California Mastitis Test (CMT) was used by few women to diagnose mastitis. Vaginal discharge was principle sign used for heat detection by majority of women. Majority of women were able to breed their animals within three months of calving. AI was very popular in studied region; mostly AI workers and semen of cooperative dairy were in demand for it. Half respondents were doing AI after 12-24 hours of onset of oestrous. Services/conception was 2 in majority cases. Nearly all respondents were feeding colostrum to calves. Majority of respondents were vaccinating their animals for FMD and HS vaccines. It can conclude that women dairy farmers of SK district are practicing dairy farming very well, however, awareness about modern practices needs to be created among for further improvement in performance of dairy farming in SK district.

Keywords: Colostrum, family size, health care, land holding, milking, vaccination, teat cup

Introduction
After independence cooperative dairy system particularly in Gujarat is becomes center of dairy farming. At present each and every districts of Gujarat has been covered by cooperative milk procurement channels. The cooperative dairies are also supporting dairy farmers by providing health care facilities at door step, breeding and nutrition support, selling of concentrate and usable dairy consumable at reasonable cost to dairy farmers. However, productivity depends on prevailed feeding, management and healthcare practices which are mostly gained from their ancestors. Therefore, there is vast variation in prevailing dairy management practices from caste to caste and region to region. Experts from worldwide are working for development of modern technology and equipments to make dairy farm even more profitable. Among new technologies imported and sex sorted semen, TMR machines, fodder reaper with chopper, milking parlour, bulk milk cooler, milk replacers, calf starter etc are boon to the farmers. Government is providing subsidies for purchasing such equipments. Many specialized dairy farms in north Gujarat are using them successfully (Gadhvi *et al.*, 2020a) [3]. As per said report subsidies were availed by 50% of farmers for purchase of a tractor, 70% for shed, 75% for chaff cutter, 45% for a milking machine, 30% for a rubber mat, and 55% farmers for livestock. The Sabarkantha (SK) district is fall under semi-arid type region located in north Gujarat. District is having seven talukas and among them three talukas is tribal dominating. The dairy farmers in SK district are very well supported by Sabar dairy and by government of Gujarat. The people of district are hard worker and animal lovers. However, still there is lot of scope to improve the productivity and profitability from livestock keeping. Thus, Government of Gujarat has sanctioned head quarter of Kamdhenu University at Rajpur (Nava) village of Himatnagar taluka in SK. Therefore, to develop suitable strategies to improve profitability from dairy farming a pilot survey to know prevailed dairy husbandry practices among women in SK district was planned.

Materials and Methods

Prevailed status and animal husbandry practices among women dairy farmers in Sabarkantha district of Gujarat was studied by selecting 150 women farmers located in all seven talukas of district. Twenty each farm women was selected randomly from Idar, Prantij, Talod, Khedbrahma, Vijaynagar and Vadali; whereas 30 women were selected randomly from Himmatnagar taluka. Desired information was collected by questionnaire. The collected data were summarized and grouped. It was analyzed in SPSS 26 software. The collected scale data about age, family size, and number of animal kept and land holding were categorized in various classes by using visual binning in SPSS. After performing normality test for dataset the χ^2 test was performed along with frequency distribution in nonparametric test in SPSS 26.

Results and Discussion

The demographic profile and socioeconomic characteristics of women dairy farmers is depicted in Table 1. The scale data about age of respondents were binned into three groups i.e early adulthood (<= 35 Years), midlife (35-50 Years) and mature adulthood (>50 Years). Data presented in table showing that age category among all women was significant. It is showing clearly that majority of women were belonged to midlife age followed by early adulthood age. Younger women are operating livestock rearing is welcoming. As younger people are more enthusiastic and quick learner, hence, they can take the challenge to upgrade their farming by using newer technologies. Similar to present finding Gadhvi *et al.* (2020a) [3] shown that specialized dairy farm owners in north Gujarat was mostly early adulthood or midlife group. They also stated that more number of people of mature adulthood age was dominating in dairy business in south Gujarat; mostly due to their dependency on labours. Family size was divided into two categories i.e Nuclear (6 or less member) and Joint (7 or more members). The age category was significant means number of women in both groups were unequal and deviated toward nuclear family (79.3% v/s 20.7%). Number of animal kept was also significant as majority of women were keeping upto 3 animals. However, good deal of women was also keeping more than 5 animals. Majority of women were having pakka house. The dairy enterprise in studied region was mostly by mixed farming system as majority respondents (94%) were having land. Land holding of 2.4-6 acre was possessed by most of families. Source of irrigation was mostly open well followed by bore well.

Table 1: Socio economic characteristics of women dairy farmers in Sabarkantha district

Parameters	Classes	n	%	χ^2 value
Age category	Early adulthood (<= 35 Years)	51	34	3.6*
	Midlife (35-50 Years)	59	39.3	
	Mature adulthood (> 50 years)	40	26.7	
Family size	6 or less members	119	79.3	51.6*
	7 or more members	31	20.7	
Animal kept	3 Cow/buffalo	76	50.7	24.3*
	4 Cow/buffalo	27	18	
	5 or more Cow/buffalo	47	31.3	
Type of resident house	Pakka	128	85.3	74.9*
	Kachha	22	14.7	
Land holding	Yes	141	94	116.2*
	No	9	6	
Land holding (Acre)	<= 2.40 Acre	47	31.3	3.4*
	2.41-6.00 Acre	56	37.3	
	6.01 or more Acre	38	25.3	
Source of irrigation	Bore well	51	34	69.4*
	Open well	67	44.7	
	Bore well & Open well	4	2.7	
	Other	20	13.3	

* Significant (p<0.05)

Milking management practices used by women dairy farmers in SK district is presented in Table 2. It is showing that milking was mostly done by her. Clean milk production and preventing mastitis in animals has first priority now a day. Hence, cleaning of animal, udder, teat with water and preferably by antiseptic has prime importance. Table is showing that women dairy farmers of SK district are aware about it as about 23% respondents were bathing their animals, 91% women were washing teats before milking. Patel *et al.* (2018) [8] revealed that most of the farmers were bathing animal on periodical basis rather than on daily bases. Divekar and Trivedi (2017) [2] reported that about 75% farmers were washing their animals before milking in Panchmahal and Kheda district of Gujarat. Rathva *et al.* (2019) [9] revealed that all farmers was cleaning udder by splashing water on udder. To keep teat orifices protected from germs use of teat dip cup with iodine compounds or herbal antiseptic solution in it before and after milking is modern and convenient way. It is also protecting animals from mastitis and thus, recommended for clean milk production. The teat cups and iodine based antiseptic solution is impactful technology which is major tool developed so far for protecting animals from mastitis. It is general practice to for using them before and after milking. Postdipping is always safe and recommended for farmers. However, predipping teats with an iodine-based sanitizer is an acceptable practice, but must be performed with the appropriate product and completely wiped off before milking (Borucki Castro *et al.*, 2012) [1]. Table showing that few women are using teat dip cups. Dip cups is novel approach for rural area, hence, its adoption was observed nil to low (Divekar and Trivedi, 2017) [2]. Therefore it is need to create awareness for the same by providing input kits with proper training. Milking method is also their role in keeping teats healthy for the entire life of animals. Table showing that knuckling a wrong method of milking was employed by majority of respondents (57%) followed by full hand a correct

milking method (43%). Divekar and Trivedi (2017) [2] reported that almost 80% farmers of middle Gujarat region were also using knuckling method of milking. However, women who were followed full hand milking in present study were better than former finding. Even as far as milking method concern women dairy farmers of SK were also better than commercial urban and peri urban dairy farmers of south Gujarat (Rathva *et al.*, 2019) [9]. Majority of women were discarding first strip of milk. It is in accordance with Rathva *et al.* (2019) [9]. Silence and pleasant environment during milking is general recommendation for complete let down. Majority of women are using cold water for washing of utensils. Washing of vessels and household utensils are in general traditionally washed by cold water as it serves visible purpose. Rathva *et al.* (2019) [9] revealed that more farmers were using hot water as hot water with detergent is better way to clean utensils used for keeping milk is desirable for better milk quality. However, said study was covered the commercial dairy farmers who were selling the milk themselves; whereas, milk was selling to society immediately after it is produced in present study. Therefore, cleaning of utensils by cold water might serve the purpose. California Mastitis Test (CMT) is convenient way to detect mastitis. Even farmers can do it. However, few women were using it in present report which is in agreement with Rathva *et al*. (2019) [9]. They reported more farmers were using mastitis test (35%) than present finding (12%). Caring the calves is very crucial for future of dairy farming. Table showing that women were not compromising with calf rearing as majority women are caring them herself.

Table 2: Milking management practices used by women dairy farmers of Sabarkantha district (n=150)

Parameters	Classes	n	%	χ^2 value
Milking by	Woman	147	98	282.3*
	Man	2	1.33	
Bath of animal before milking	Yes	34	22.67	-
Washing of teats before milking	Yes	136	90.67	-
Use of teat dip before milking	Yes	8	5.33	-
Use of teat dip after milking	Yes	4	2.67	-
Milking skill method	Full hand	64	42.67	76.4*
	Knuckling	85	56.67	
	Milking machine	1	0.67	
First strips discarding	Yes	99	66	-
Keeping distance with another animal while milking?	Yes	85	56.67	-
CMT test of milk	Yes	18	12	-
Washing of utensils	Cold water	141	94	126.7*
	Soap	5	3.33	
Care of calf	Woman	135	90	96.0*
	Man	15	10	

* Significant (p<0.05)

Breeding management practices of women dairy farmers of SK district is given in Table 3. It reveals that observing vaginal discharge was principle sign used for heat detection by majority of women. Many women used it in combination of symptoms. Vaginal discharge is good and perfect sign to observe cows in heat, however, it is seldom seen in buffaloes. Therefore, most of buffalo owners were used symptoms to find females in heat. Khandelwal *et al*. (2020) [6] reported that majority farmers were using various signs like bellowing, mounting on other animals, feeling restless, frequent urination, smelling to detect estrous. Calving interval is main economic characteristic of dairy animals affecting economics of particular animals. Ideally it should be 13-14 months and it is only possible if we can bred the animals within three months after calving. Study revealed that majority of women is able to breed their animals within three months of calving. The ideal breeding time was possible as mostly they were rearing crossbred cows which are regular calvers. Majority of women dairy farmers were isolating the down cows before calving in order for better care and observation. The AI was exploited by women as majority has used it. Total 30 farmers were having their own bulls. They were mainly purchased it from other farmers. Majority of farmers were replied that they were mostly using semen doses supplied by dairy. However, some were also using semen supplied by animal husbandry department, government of Gujarat. Success of AI is mostly depends on quality of semen doses. Quality in terms of sperm concentration and viability is also important but semen from pedigreed or progeny tested bulls is having great demand now a day; thus, farmers in north Gujarat are using imported semen doses from ABS and Semex company. However, in present study few dairy farmers were used the semen doses from private sources. Use of sex-sorted and pedigree semen will prove as a game-changer for all such dairy farms through the birth of more number of healthy and high yielding heifers. AI was mostly carried out by AI workers (49%) followed by livestock inspectors (22%). Generally maintaining time after onset of oestrus is important, therefore, women were preferred AI worker from her village itself for sack of convenience to maintain AI time. Gadhvi *et al.*, (2020b) [4] also shown that mostly AI was done by AI workers in specialized farms of north Gujarat. More than half respondents were doing AI after 12-24 hours of onset of oestrous which is ideal. Similar to present finding Khandelwal *et al.* (2020) [6] reported that about 63% of owners were allowing breeding in mid estrus. Women mostly using AI, hence majority of women were got services/conception is 2 or more. However, about 47% respondents were able to breed their animals in first service only.

Table 3: Breeding management practices used by women dairy farmers of Sabarkantha district (n=150)

Parameters	Classes	n	%	χ^2 value
Heat detection	Vaginal discharge	73	48.67	25.5*
	Symptoms	23	15.33	
	Vaginal discharge +Symptoms	54	36	
Breeding after calving	<2 Month	18	12	110.2*
	2-3 Month	88	58.67	
	3-5 Month	41	27.33	
	>5 Month	3	2	
Isolation before calving	Yes	139	92.67	109.2*
	No	11	7.33	
Service method	AI	120	80	54.0*
	NS	30	20	
Procurement of bull	Farm bred	10	6.67	9.8*
	Other farmers	17	11.33	
	Others	3	2	
Source of semen	Dairy	99	66	77.3*
	Govt	37	24.67	
	Private company	14	9.33	
AI by	AI Workers (AIW)	74	49.33	97.0*
	LI	33	22	
	AI by dairy (AID)	8	5.33	
	VO	7	4.67	
Time of AI after onset of oestrus (Hrs)	8	36	24	87.8*
	12	22	14.67	
	18	15	10	
	24	40	26.67	
	36	7	4.67	
	48	1	0.67	
	72	1	0.67	
Services/Conception	1	71	47.33	69.5*
	2	77	51.33	
	3	2	1.33	

* Significant (p<0.05)

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. For survival of infant calves colostrum management is very important and it is presented in Table 4. It showing that 98% respondents was aware about colostrum feeding to young ones. Patel *et al*. (2018) [8] also revealed that nearly all respondents were feeding colostrum to calves. They were feeding it within first hours of their life by majority of women. It is in agreement with Gadhvi *et al*. (2020b) [4] and Rathva *et al*. (2020) [10]. However, Patel *et al.* (2018) [8] found that majority of the respondents (78.53%) fed colostrum to calves after expulsion of placenta which can delay colostrum feeding.

Table 4: Calf rearing management practices used by women dairy farmers of Sabarkantha district (n=150)

Parameters	Classes	n	%	χ^2 value
Colostrum given	Yes	147	98	138.2*
	No	3	2	
Feeding time of colostrum	< 1 Hr	109	72.67	200.4*
	1-2 Hr	3	2	
	2-4 Hr	29	19.33	
	> 4 Hr	6	4	

* Significant (p<0.05)

Health care of animals by means of vaccination is very important modern practice which is well supported by government and dairy authority. The detail health care practice is depicted in Table 4. It reveals that majority of respondents were vaccinating their animals. It is accordance with Patel *et al.* (2018) [8]. Veterinary dispensaries, ICDP and Sabar dairy are doing vaccination of animals. During survey it was came to know that women mostly prefers FMD and Theileriosis vaccine from private source rather than government. Gadhvi *et al.* (2020c) [5] also reported that FMD and BQ were used by almost all specialized farms, however, majority farms were preferred doses from private companies. Majority of women were calling Livestock Inspector for vaccinating their animals on payment basis. FMD and HS vaccines were widely used by respondents as both are available free of cost from government. Patel *et al*. (2019) [7] also revealed that majority of respondents (85%) of south Gujarat practiced regular vaccination to their animals against F.M.D. and H.S.

Table 5: Healthcare management practices used by women dairy farmers of Sabarkantha district (n=150)

Parameters	Classes	n	%	χ^2 value
Vaccination	Yes	133	88.67	89.7*
	No	17	11.33	
By whom vaccination?	Dairy	14	9.33	96.2*
	Govt	31	20.67	
	Calling LI	80	53.33	
	Calling VO	8	5.33	
Vaccination against	FMD	118	78.67	-
	HS	97	64.67	-
	BQ	18	12	-
	Anthrax	28	18.67	-
	Rabies	14	9.33	-
	Theileriosis	8	5.33	-

* Significant (p<0.05)

Conclusion

The women dairy farmers were midlife aged. They are keeping good number of crossbred cows and buffaloes along with agriculture. They are practicing dairy farming well, however, it requires improving the milking practices by inclusion of teat dip cups, correct milking method and performing mastitis detection tests periodically. Therefore, awareness programmes, training for good practices along with supply of input kits to women dairy farmers by some government project like Farmer's First project or RKVY project etc needs to be arrange for further improvement.

Acknowledgements

Authors thank the authorities of Kamdhenu University, Gandhinagar, Gujarat for the facilities provided for this research work.

Conflict of Interest: Nil.

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