*RESEARCH ARTICLE.........*

# Knowledge level of dairy farmers regarding clean milk production practices at field level in western U.P.

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**ABSTRACT......** The milk quality is determined by aspects of composition and hygiene of milk, where breeding, feeding, management of healthcare, fodder production, and many such facts mainly influence the compositional quality of milk. Dairy farmer is the key client in this process, who decides the quality of milk from milk production to milk supply chain. This study was conducted to know the level of knowledge of dairy farmers regarding clean milk production practices. Uttar Pradesh state was selected purposively for this study, where 120 dairy farmers (60 CMP and 60 N-CMP) from the milk shed area of four districts milk union were selected. The results of the study revealed that 71.67 and 61.6 7 per cent of the dairy farmers had medium level of knowledge in various aspects of CMP and N-CMP followed by 10 and 25 per cent had low level of knowledge while, 18.33 and 13.33 per cent of them having high level of knowledge, respectively. They had highest knowledge in milking [Knowledge index (KI) =75.41 and 68.45], followed by healthy herd management (KI=66.84 and 61.54). However, they had poor knowledge in 'cooling of milk (KI=56.66 and 51.12) and 'cleaning of utensils (KI=58.22 and 54.58) in CMP and N-CMP, respectively.

**KEY WORDS......** Knowledge index, CMP, Practices, N-CMP, Dairy farmer, Milk union

## INTRODUCTION...................................................

Indian dairy sector needs to build its competitiveness on the basis of quality, productivity and efficiency to continue its march towards success in national and international market (Kurien, 2004). In India fast deterioration in milk quality has been observed by the time it reaches from milk producer to processing plant. One of the major factors for low export of our dairy products has been the quality and safety aspects of the raw milk. Consumers all over the world have become quality conscious and prefer high quality products. This needs to be taken into consideration of strictly follow the clean milk production (CMP) practices at the household level. Clean milk can be defined as milk coming from healthy milch animal possessing normal flavour, devoid of dirt and filth containing permissible limit of bacteria and essentially free from adulterants, pathogens, various toxins, abnormal residues, pollutants and metabolites (Gupta, 2003). Clean milk is obtained from a clean and healthy milch animal kept in clean

environment drawn by clean persons by following:

**Clean methods of milking and handling :**

Cleanliness of animal and its surroundings. Use of clean milk handling vessels. Quick delivery of milk to dairy co-operative society. Fast receiving of milk at society through automatic milk collection station. Immediate cooling of raw milk at DCS or early transportation of milk to dairy dock in clean stainless steel can (Srivastava, 2010). Environment, milch animal, milking practices, milker, milking utensils are important factors responsible for poor microbiological quality of milk at primary production level, hence, measures should be implemented at the primary production level to reduce the initial load of pathogenic micro-organisms and micro-organisms affecting safety and suitability. Pradeshik Co-operative Dairy Federation Ltd. (P.C.D.F.) is an organization, which works on amul pattern in dairy sector and has introduced innovative programme aiming at CMP. Uttar Pradesh registered 42 districts co-operative milk unions under P.C.D.F. Pradeshik Co-operative Dairy Federation Ltd. Lucknow adopted clean milk production programme in 2004 in collaboration with N.D.D.B. The P.C.D.F. Lucknow assisted 6 milk unions (Sitapur, Meerut, Moradabad, Bulandshahr, J.P. Nagar and Lucknow). The CMP involves thorough cleanliness at all phases of handling and stringent quality control and hygienic measures have to be adopted at farm level. The present study was planned to know the knowledge level of dairy farmers regarding clean milk production practices at field level in western U.P.

**RESEARCH METHODS**.....................................

The study was conducted in Uttar Pradesh state (mainly in western Uttar Pradesh) which was purposively selected. Study was mainly focused on status of clean milk production in western Uttar Pradesh. So it was utmost important to select only those milk unions, which were having sufficient number of co-operative societies under CMP programme. The representation of four Milk unions namely, Meerut, Moradabad, Bulandshahr and Jyotiba Phule Nagar were selected purposively for the study. After selection of four milk unions, in each union select four villages dairy co-operative societies (Kaul, Tigri under CMP and Dhantla, Dadri under N-CMP from Meerut union, Dheri, Chaupura under CMP and Lodhipur vashu, virpurthan under N-CMP from Moradabad union,

Saidpur, Dhakoli under CMP and Kisoli, Raina under N-CMP from Bulandshahr union, Rajhoya, Kuakhera under CMP and Mahila Nazirpur, Hasanpur klan from J.P. Nagar union) in which two societies under CMP (clean milk production) and two societies under N-CMP (Not covered under Clean Milk Production) were selected purposively, out of which two societies one under CMP and one under N-CMP which was nearest to dairy plant and two societies one under CMP and one under N-CMP which was farthest from dairy plant in that villages. Thus, the purpose was to decide the effect of distance on raw milk quality. The totals of 120 farmers (60 CMP and 60 N-CMP) were selected. In each district 30 selected dairy farmers was again divided in two groups *i.e.*,15 farmers of CMP programme under dairy co-operative and 15 farmers of N-CMP programme under dairy co-operative Such type of distribution of sample size was done for assessing the comparison between CMP programme and N-CMP programme villages. CMP villages means those societies who are working under district co-operative societies and many facilities was providing by government .While N-CMP villages was also working under district co-operative societies but they have not avail above facilities. After selection of milk societies a list of dairy farmers from each dairy co-operative society in four selected milk unions, who were pouring milk for the last two years, was prepared. The reference period was 2008-09. The interview schedule was prepared by incorporating all the inevitable information required for the study. While constructing the interview schedule, the objectives and dimensions of the study was kept in view. The designed interview schedule was pre-tested in the non-sampling area with respondents using different CMP practices in order to remove ambiguity if any. The various statistical tools was use, these were frequency, percentage, means, standard deviation, correlation co-efficient and ranking for preliminary analysis of variables. The milk quality was measured by methylene blue reduction time (MBRT) test.

**Knowledge about CMP practices :**

It refers to the extent of information possessed by and understanding of the respondent about selected scientific dairy farming practices used for CMP. The selected items were divided into following heads: healthy herd, housing, cleaning of animal, feeding, milking, cleaning of utensils, cooling of milk and transportation.

To quantify the responses of individual dairy farmer, the data were collected on the basis of dual ended responses *i.e.* Yes (score 1) and No (score 0). The following formula was used to measure the knowledge index of all aspects of CMP practices.

$$\text{Knowledge score} = \frac{\text{Score obtained}}{\text{Maximum obtainaible score}} \times 100$$

## RESEARCH FINDINGS AND ANALYSIS...........

The results obtained from the present investigation as well as relevant discussion have been summarized under the following heads :

### Knowledge level of dairy farmers in various aspects of CMP practices :

The term knowledge level refers to the gap between what is expected of dairy farmers of a certain age and grade, versus the actual performance and knowledge level. It also refers to inequities or insufficient abilities in the learning process associated with dairy farming practices. The inability to dairy farming practices at an appropriate age or grade level would be considered a knowledge level of dairy farmers. The knowledge test, which included items from different aspects of CMP was developed to ascertain the knowledge level of the dairy farmers. Further, overall index as well as index for all eight aspects of CMP *viz.,* healthy herd management, housing, cleaning of animal, feeding, cleaning of utensils, and transportation was developed, under CMP and N-CMP village. Results regarding knowledge level in different aspects of CMP have presented in Table 1.

**Table 1 : Knowledge level of dairy farmers in various aspects of clean milk production practices**

| Sr. No. | Aspects | Category | Criteria (Score) | Frequency (%) | | Knowledge index | |
|---|---|---|---|---|---|---|---|
| | | | | CMP | N-CMP | CMP | N-CMP |
| 1. | Healthy herd Management | Low | <13.68 | 03 (5) | 14 (23.33) | 67.84 | 61.54 |
| | | Medium | 13.68 to 16.16 | 42 (70) | 35 (58.33) | | |
| | | High | >16.16 | 15 (25) | 11 (18.33) | | |
| 2. | Housing | Low | <6.79 | 05 (8.33) | 12 (20) | 63.51 | 60.45 |
| | | Medium | 6.79 to 10.09 | 37 (61.67) | 40 (66.67) | | |
| | | High | >10.09 | 18 (30) | 08 (13.33) | | |
| 3. | Cleaning of animal | Low | <3.96 | 0 (0) | 03 (5) | 59.37 | 58.11 |
| | | Medium | 3.96 to 5.54 | 41 (68.33) | 42 (70) | | |
| | | High | >5.54 | 19 (31.67) | 15 (25) | | |
| 4. | Feeding | Low | <4.04 | 12 (20) | 25 (41.67) | 60.93 | 58.26 |
| | | Medium | 4.04 to 5.70 | 28 (46.67) | 26 (43.33) | | |
| | | High | >5.70 | 20 (33.33) | 09 (15) | | |
| 5. | Milking | Low | <12.55 | 02 (3.33) | 08 (13.33) | 75.41 | 68.45 |
| | | Medium | 12.55 to 14.59 | 48 (80) | 44 (73.33) | | |
| | | High | >14.59 | 10 (16.67) | 08 (13.33) | | |
| 6. | Cleaning of utensils | Low | <3.88 | 01 (1.67) | 04 (6.67) | 58.22 | 54.58 |
| | | Medium | 3.88 to 5.42 | 46 (76.67) | 46 (76.67) | | |
| | | High | >5.42 | 13 (21.67) | 10 (16.67) | | |
| 7. | Cooling of milk | Low | <1.79 | 0 (0) | 06 (10) | 56.66 | 51.12 |
| | | Medium | 1.79 to 2.73 | 44 (73.33) | 40 (66.67) | | |
| | | High | >2.73 | 16 (26.67) | 14 (23.33) | | |
| 8. | Transportation | Low | <3.98 | 05 (8.33) | 17 (28.33) | 58.95 | 54.08 |
| | | Medium | 3.98 to 5.44 | 42 (70) | 35 (58.33) | | |
| | | High | >5.44 | 13 (21.67) | 08 (13.33) | | |
| | Overall | Low | <55.79 | 06 (10) | 15 (25) | 65.17 | 59.88 |
| | | Medium | 55.79 to 61.51 | 43 (71.67) | 37 (61.67) | | |
| | | High | >61.51 | 11 (18.33) | 08 (13.33) | | |

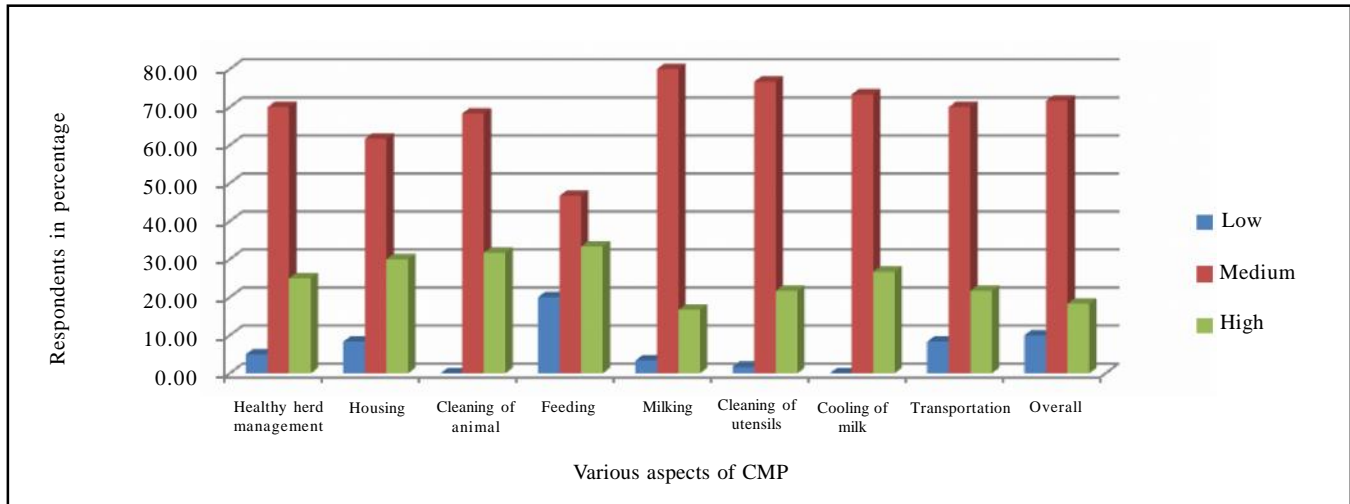(Figures in parenthesis indicate percentage)

**Fig. 1 :   Knowledge level of dairy farmers in various aspects under CMP**

**Knowledge regarding healthy herd management practices :**

A close perusal of Table 1 indicated that 70 per cent and 58.33 per cent farmers had medium level knowledge regarding healthy herd management under CMP and N-CMP village, respectively followed by low and high category with 5 per cent, 23.33 per cent and 25 per cent, 18 per cent under CMP and N-CMP village, respectively. Further their knowledge index was 67.84 and 61.54 under CMP and N-CMP village, respectively which is a second position of these aspects of CMP practices. Healthy herd management aspect included items *viz.*, disease of animals and their local treatments, adaptation of oxytocin, mastitis etc. Farmers in study area having close attachments with their animals from generation to generation might be responsible for their caring nature towards their animals. They had awareness of contagious diseases and used vaccination against them. Most of the respondents were able to identity symptoms of different disease like foot and mouth disease (F.M.D.), rinder pest (R.P.), black quarter (B.Q.), hemorrhagic septicemia (H.S.) and the clinical mastitis [some times at sub-clinical stage by using mastrip, (mestrip is a litmus type paper which developed by NDDB for checking the mastitis according to its stages)] as they had long experience in rearing of animals, particularly cattle and buffaloes.

**Knowledge regarding housing of animals practices:**

Data in Table 1 revealed that 61.67 per cent and 66.67 per cent of the farmers had medium level of knowledge regarding housing of animals under CMP and N-CMP village, respectively, on the other hand 30 per cent and 13.33 per cent dairy farmers were in high knowledge category under CMP and N-CMP village, respectively, followed, by 8.33 per cent and 20 per cent had low level knowledge regarding housing under CMP and N-CMP village, respectively. The knowledge index of this aspect was 63.51 and 60.45 satisfactory than all other aspects under CMP and N-CMP village, respectively. In the present study, the research area was basically from desert part of western Uttar Pradesh, where dairy farming is the traditional enterprise. Most of the farmers had good knowledge regarding general practices *viz.*, availability of potable water, provision of proper aeration, disposal of wastes (for this purpose all the farmers in J.P. Nagar region using traditional method of compost making), plenty of bedding etc. because they were using from last several years. The overall performance regarding knowledge in this aspect was highest in Meerut followed by milk union area.

**Knowledge regarding cleaning of animals practices:**

Cleaning of animals is first step in hygienic maintenance of CMP followed by cleaning of milker and utensils. A close perusal of Table 1 indicates that most of the respondents were 68.33 per cent and 70 per cent in medium category for the knowledge of cleaning of animals under CMP and N-CMP village, respectively whereas, 0 and 5 per cent were in low knowledge

category under CMP and N-CMP village, respectively followed by 31.67 per cent and 25 per cent in high level under CMP and N-CMP village, respectively. Further, it can be seen from the table that the calculated knowledge index 59.37 and 58.11 was the apropos CMP practices under CMP and N-CMP village, respectively (among the different aspects of CMP starting from housing to transportation) *i.e.* the main emphasis in animal cleaning are cleaning before and after the milking by using clean water followed by rinsing with a cloth. This particular situation is an impediment in adoption of cleaning udder with water. Hence, brushing and dry animal cleaning are more relevant in this part of the country.

**Knowledge regarding feeding practices :**

The figures presented in Table 1 showed that 46.67 per cent and 43.33 per cent of the dairy farmers had medium level of knowledge regarding feeding practices under CMP and N-CMP village, respectively followed by those having high (33.33 % and 15 %) and low (20 % and 41.67 %) level of knowledge under CMP and N-CMP village, respectively. A critical observation of the results suggested that the calculated knowledge index 60.93 and 58.26 among the respondents was satisfactory than some other aspects under CMP and N-CMP village, respectively and meanwhile it is also a basic aspect of CMP. So, it is indication for programmers or respective milk unions to technology in the form of product or knowledge, which enhances the milk quality. The present study was conducted under co-operative system of Uttar Pradesh, where feeding materials like concentrates, minerals mixtures, seed of high yielder fodder crops and some growth promoters were provided by milk union, on reliable cost with all relevant information regarding use and manufacturing, resulting in higher scores in the present study. The major brand of concentrates was manufactured by P.C.D.F. at their feed plants in Meerut.

**Knowledge regarding milking practices :**

The milking practices include methods of milking, cleaning of milker, use of teat dipping, collection of first milk after stripping in separate utensil etc. all these practices are recommended under CMP, which are disseminated through different training programmes, group meetings and educational tours and by milk route supervisor to the dairy farmers in all the selected milk unions as a routine work. Table 1 revealed that the effect of all these activities, where the knowledge index 75.41 and 68.45 was highest in all aspects of CMP under CMP and N-CMP village, respectively. The table also indicated that majority of respondents 80 per cent and 73.33 per cent were in medium category under CMP and N-CMP village, respectively followed by 3.33 per cent and 13.33 per cent in low level category of knowledge under CMP and N-CMP village, respectively. Only 16.67 per cent and 13.33 per cent of farmers had high level of knowledge in this aspect under CMP and N-CMP village, respectively but mean value of medium category. It was very interesting to know that most of the farmers under CMP route in Kaul and Dhakoli had good knowledge on teat dipping as well as cleaning of udder by using clean cloth, but in J.P. Nagar and Moradabad union it was poor.

**Knowledge regarding cleaning of utensils practices:**

Cleaning of utensil is the major part of CMP practices, where utensil is prone to aspects related to milk quality deterioration. So, there was an urgent need was felt to know the knowledge level of dairy farmers regarding cleaning of utensils. The data presented in Table 1 showed that 76.67 per cent farmers had medium level of knowledge under CMP and N-CMP village are same, followed by 21.67 per cent and 16.67 per cent in high level of knowledge category under CMP and N-CMP village, respectively. It was found that only 1.67 per cent and 6.67 per cent farmers had low level of knowledge regarding this aspect under CMP and N-CMP village, respectively, knowledge index shown somewhat second lower results with 58.22 and 54.58 score under CMP and N-CMP village, respectively. DCS secretaries of CMP milk route areas had average knowledge about cleaning of utensils and they disseminated it to their members regularly. The overall observation of Moradabad union milk shed area was appreciable, because most of the dairy farmers were using dry cleaning (dry cleaning of utensils is a traditional practice in western part of western Uttar Pradesh due to less sticky soil and scarcity water) of utensil as well as animal and they were average aware about cleaning at pail level.

**Knowledge regarding cooling of milk practices :**

Cooling of milk is an issue of discussion not only in

the Indian condition but, in whole tropical countries of the world. The milk quality is mostly in the hands of bacteria which are already available in milk and after getting higher temperature it increase by just double after every 25 minutes and cooling of the milk is only alternate for inhibiting its growth. Table 1 indicates that 73.33 per cent and 66.67 per cent of the respondents came under medium category under CMP and N-CMP village, respectively followed by 0 and 10 per cent in low category of knowledge level under CMP and N-CMP village, respectively. On the other hand only 26.67 per cent and 23.33 per cent farmers had high level of knowledge regarding cooling of milk under CMP and N-CMP village, respectively. Further, it can be seen from table that the calculated knowledge index was 56.66 and 51.15 under CMP and N-CMP village, respectively which was somewhat low than other aspects. It might be due to the lack of emphasis given by route supervisors on cooling of milk. For instance of Moradabad union, where market competition was very high and route supervisors were more emphasizing on quantity rather than quality. This may be a probable reason for the low knowledge level of farmers on milk quality.

## Knowledge regarding transportation of milk practices :

In case of transportation of milk, the present study revealed that 70 per cent and 58.33 per cent of the respondents had medium level of knowledge under CMP and N-CMP village, respectively whereas, 21.67 per cent and 13.33 per cent of them belonged to high level knowledge category under CMP and N-CMP village, respectively. On the other hand 8.33 per cent and 28.33 per cent of the farmers had low level of knowledge regarding this aspect under CMP and N-CMP village, respectively. Further, their knowledge index was 58.95 and 54.08 under CMP and N-CMP village, respectively. In the research area it was found that, all the members of DCSs were aware about time of milk collection and time of milk van's trip at society. The milk transportation van is also used as vehicle for animal feed supply as well as emergency service for animal health.

## Overall knowledge regarding CMP practices :

Table 1 revealed that 71.67 per cent and 61.67 per cent of the dairy farmers had medium level of overall knowledge regarding CMP practices under CMP and
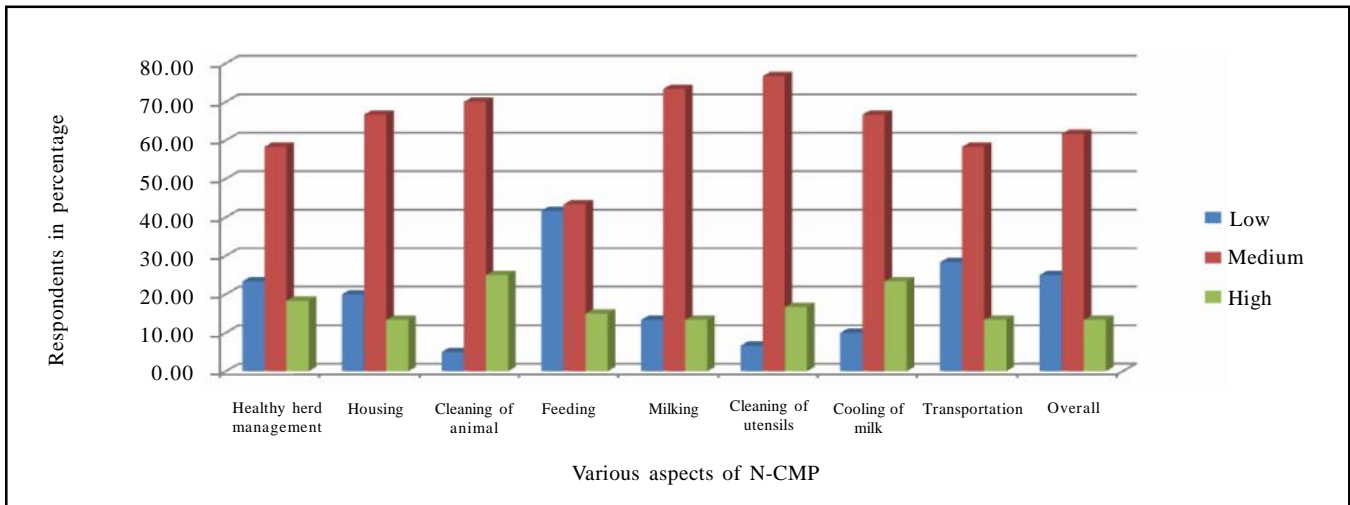


Fig. 2 : Knowledge level of dairy farmers in various aspects under N-CMP

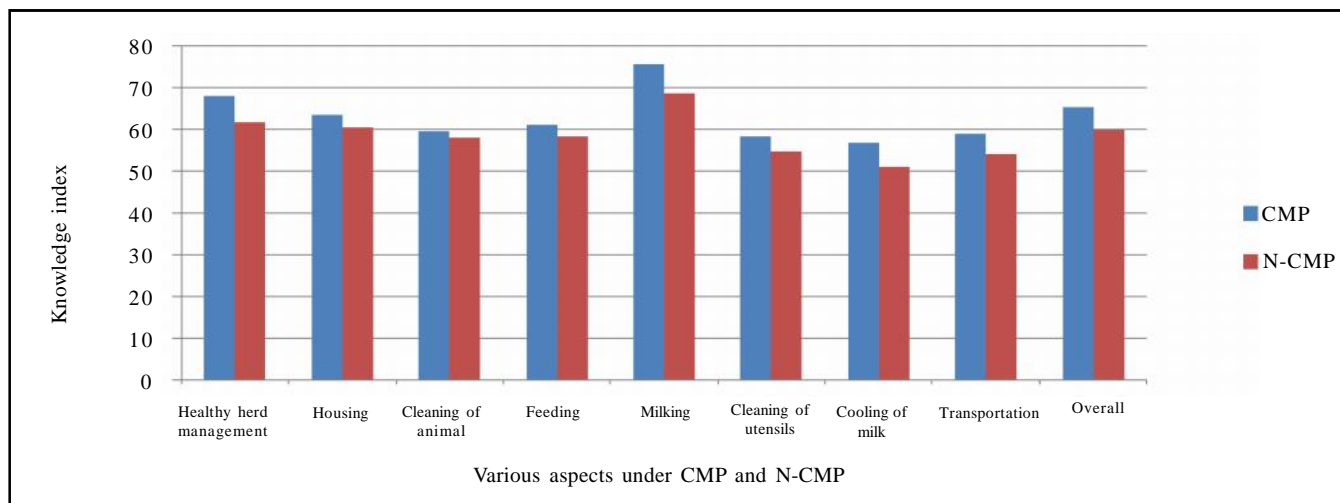| Sr. No. | Milk quality | Correlation co-efficient (r) |
|---|---|---|
| Table 2 : Relationship between knowledge level and milk quality in CMP | | |
| 1. | Pail level | 0.498** |
| 2. | DCS level | 0.545** |
| 3. | Dock level | 0.289** |

** indicate significance of value at P=0.01

**Fig. 3 :** **Knowledge index of dairy farmers in various aspects under CMP and N-CMP**

N-CMP village, respectively followed by those 10 per cent and 25 per cent having low level of overall knowledge under CMP and N-CMP village, respectively. On the other hand, 18.33 per cent and 13.33 per cent of the respondents had high level of overall knowledge under CMP and N-CMP village, respectively when all the eight aspects were combined together. These findings were in conformity with of Jamal (1989); Singh (1993); Manjunath *et al.* (1996); Maity (1999); Batianell and Bas (2002); Saha (2002); Das (2003); Donald (2004); Jayarao (2005); Sarangi (2006); Srairi *et al.* (2006); Lahoti *et al.* (2011) and Rajput *et al.* (2012) . Further analysis of data indicated that the knowledge index of the respondents, on the overall basis was 65.17 and 59.88 under CMP and N-CMP village, respectively. Table 1 overall clearly showed that knowledge level of CMP village dairy farmers in various aspects have high frequency under medium and high score category, whereas N-CMP dairy farmers have high frequency under low score category in the same aspects due to lack of aware and lack of facility about clean milk practices.

**Relationship between knowledge level and milk quality in CNP :**

In order to find out the relationship between knowledge level and milk quality, correlation analysis was carried out. Calculated co-efficient (r) for milk quality has been presented in Table 2 results in table clearly showed that milk quality at all levels of milk collection *i.e.* pail, DCS and dock level were positively correlated with knowledge level of dairy farmers. The correlation was statistically significant at 1 per cent level of significance. The relationship between milk quality and knowledge at pail and DCS level was high, but at dock level it was very less. This might be due to the more effect of temperature variables like knowledge, because the role of farmer and DCS secretary were over after loading of milk in milk van.

**Conclusion:**

The study indicated that the dairy farmers had medium level of knowledge in various aspects of CMP. However, they had poor knowledge in cleaning of animal but adopted recommended practices of transportation up to maximum extent followed by feeding. These results are showing that milk unions, research institutes and extension functionaries should develop literature and organize effective awareness programmes for CMP practices, which can support in improving the milk quality.

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