FARM WOMEN PARTICIPATORY ON-FARM TRIAL (OFT) ON PREVENTION AND CONTROL OF MASTITIS IN DAIRY CATTLE

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ABSTRACT

Two hundred women self help group members having dairy cattle were purposively selected from ten different villages in Namakkal district for this study. A Multi-disciplinary team of scientists conducted the on-farm trial and institutional training programme for the beneficiaries on different selected technologies and the demonstrations on cleaning of dairy cattle, disinfection and sanitation of shed, milking methods, cleaning of udder, wiping of udder, strip cup test-mastitis detection and teat dipping were conducted. Inputs like mastitis detection Kit (Sodium lauryl sulphate reagent, strip cups), post teat dip container, povidone iodine, plastic hand sprayer, potassium permanganate, plastic bottles, test tubes for milk sample collection and reading materials were distributed to all the beneficiaries. Regular follow up was made to guide the farm women for conducting the on-farm trial (OFT). The beneficiaries reported that there was reduction in the occurrence of mastitis both in cows and buffaloes from 9.5 per cent to 1.5 per cent and 1.4 per cent to nil, respectively after imparting knowledge and skills on the mastitis detection and control techniques. The keeping quality of milk was also found to be improved through increase in Methylene blue dye reduction time of 25 minutes to one hour for cow milk and from 15 minutes to 45 minutes for buffalo milk. There was significant reduction in the somatic cell count of milk of cows and buffaloes by the adoption of the technologies.

Keywords: Mastitis, dairy cattle, women participatory OFT, knowledge level, MBRT, antibiotic sensitivity, somatic cell count.

INTRODUCTION

Mastitis is one of the most important diseases of dairy cattle affecting the economic returns of the dairy farms. (Chanda *et al.,* 1989). The risk of the disease has increased many folds in the high yielding crossbred cows. Mastitis is characterized by inflammation of udder tissue causing pathological changes in udder parenchyma and characterized by physical, chemical and microbiological changes in milk (Radostitis *et.al.,* 2000). Further, the mastitis milk is unsuitable for consumption and is one of sources communicable diseases such as tuberculosis, brucellosis, staphylococcal toxemia, septic sore throat, gastroenteritis, etc., (Kalorey., 2001).

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Mastitis reduces milk yield and alters its composition. The magnitude of these changes in individual animal varies with the severity and duration of the infection and the causative microorganisms. Mastitis is almost always caused by bacteria. These microorganisms produce toxins which directly damage milk-producing tissue of the mammary gland, and the presence of bacteria initiates inflammation within the mammary tissue in an attempt to eliminate the invading microorganisms. The inflammation contributes to decreased milk production and is primarily responsible for the compositional changes observed in milk from infected quarters and cows. In general, compositional changes involve an increase in blood components present in milk and a decrease in normal milk constituents.

According to Samanta and Prasad (1998), the world dairy industry suffers an economic loss of approximately $ 35 billion due to mastitis every year. In United States of America a loss of $ 200 per cow per year has been reported due to mastitis, which amounts for a total loss of $2 billion per year. Overall, the Indian Dairy Industry suffers a total monetary loss of over Rs.16073 million per year due to mastitis (Kalorey., 2001). Although notable progress has been made in prevention of mastitis by appropriate hygienic measures, enhanced control of milking techniques and antibiotic treatment of dry cow, but it is still necessary to treat a large number of cows which suffer from mastitis. The multiplicity of the cause and emergence of indiscriminate and prolonged use of antibiotics in absence of antibiogram is a major hurdle in the control of mastitis. To overcome this problem in the way of making "White Revolution" a success and with due consideration to the economic losses the present investigation was undertaken to ascertain the current drug sensitivity pattern of causative agents of mastitis.

MATERIALS AND METHODS

Two hundred women self help group members having dairy cattle were purposively selected from ten different villages in Namakkal district of Tamil Nadu, under a scheme funded by the Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India, New Delhi, during the year 2006 and follow-ups were made up to 2010. A before-after research design was followed for the study. Intensive training programme was conducted in each of the 10 selected villages. Among the 200 women farmers from 10 Self help Groups those who have lactating animals were selected for OFT. In that way 159 farmers have participated in the OFT on mastitis detection, prevention, and control.

Multi-disciplinary team conducted the on farm and institutional training programme for the beneficiaries on identified technologies and the demonstrations on cleaning of dairy cattle, disinfection and sanitation of shed, milking methods, cleaning of udder, wiping of udder, strip cup test-mastitis detection and teat dipping were also conducted. Inputs like mastitis detection Kit (Sodium lauryl sulphate reagent, strip cups), post dip container, povidone iodine, plastic hand sprayer, potassium permanganate, plastic bottles, test tubes for milk sample collection and reading materials were distributed to all the beneficiaries.

To diagnose clinical/sub-clinical mastitis in milch cows/buffaloes, two ml of milk has to be mixed with two ml of test solution (4% sodium lauryl sulphate in 15% teepol solution and pH adjusted to 12.0) by shaking gently for 20 seconds in the strip cup provided and observed for coagulation. If there is thin layer of slow flowing viscid mass indicates the mild form of sub-clinical mastitis. If the coagulation has clear viscid material, it indicates the severe form of clinical mastitis. The farmers were advised to perform the test on alternate days in the first week after calving,

then weekly once and whenever there is doubt about mastitis.

If the animal is positive for mastitis then one ml of milk sample from the affected Quarter has to be taken in sterile test tube and sent to the lab for antibiotic sensitivity test. Suitable remedies were suggested by the specialists to solve the problems based on the results.

A teacher made knowledge test was developed in a simple vernacular language and the same was employed thrice viz., before training, after training and 30 days after training to assess their retention of knowledge learned during the training. The enhancement in the knowledge level is the difference between knowledge retention score and the pre-training knowledge score. A semi-structured interview schedule was prepared and employed for data collection. Descriptive statistics were employed to interpret the findings.

RESULTS AND DISCUSSION

a. Knowledge level of women dairy farmers on prevention of mastitis

Pre-exposure and post-exposure knowledge tests were conducted to all the 159 beneficiaries focusing on the objectives of the scheme before and after conducting a training programme. Retention level was tested 15 days after the training programme.

Table 1

Knowledge level of the beneficiaries on prevention of mastitis

N=159

S.No.	Technologies / practices	Pre-exposure %	Post-exposure %	Retention %
1	Causes of mastitis	20.00	89.00	76.00
2	Cleaning the shed and dairy animal	38.10	88.80	79.80
3	Cleanliness of milkman	12.00	85.00	81.00
4	Cleaning of udder with KMnO4 solution	7.00	92.55	82.55
5	Wiping the udder with clean cloth	15.00	87.00	80.00
6	Full hand milking method	31.62	83.12	76.25
7	Dipping the teats in KMnO4 solution after milking	7.00	75.00	65.75
8	Detection of sub clinical mastitis	2.00	90.25	78.56

Table 1 indicates that the overall knowledge level of the beneficiaries has increased after imparting the training on the various technologies / practices on livestock management through the scheme. Particularly the pre exposure knowledge level of detection of sub clinical mastitis, cleaning of udder with KMnO4 solution, dipping the teats in KMnO4 solution after milking, and wiping the udder with clean cloth was very poor (2 to 15%) and the percentage of retention knowledge level ranged from 65.75 to 82.55. This indicates the effectiveness of the training. Akin

results were reported by Sharma et al., (2014) that number of farmers having knowledge about cause of mastitis increased from 6.67 per cent to 81.67 per cent with increase in average knowledge score from 1.26 to 5.87 after training programmes on dairy farming. They also reported that none of the trainees was aware about the prevention and control of mastitis before training, while 85.0 per cent of them became knowledgeable about it after training with an average knowledge score of 6.54.

b. Constraints faced by the women dairy farmers in mastitis detection and prevention

Table 2

Constraints faced by the dairy farm women in prevention and control of mastitis

S.No	Constraints	%
1.	Not aware of the subclinical mastitis detection test	100%
2.	Treatment costly	82.00
3.	Lack of awareness on mastitis prevention methods	60.00
4.	Animal not responded to treatment	76.00
5.	Affected quarter become dormant	30.00
6.	Heavy economic loss	90.00

It could be observed from Table 2 that only 40 per cent of the dairy farmers aware about mastitis prevention methods and none of them aware about subclinical mastitis. The beneficiaries stated that if a cow / buffalo affected with mastitis, they had to spend more money for the treatment because it was costlier (82%). They also perceived that most of the time the animal was not responded to treatment (76%) and if the mastitis was not cured, then the particular quarter could become dormant (30%), thereby they used to get huge economic loss earlier (90%). Similar results were reported by Byarugana et al., (2008) who stated that none of the dairy farmers knew about subclinical mastitis and most of them considered mastitis a major constraint to their milk production.

c. Impact of the OFT on mastitis detection & prevention

The analysis of benchmark survey revealed that 9.5 per cent of the beneficiaries had faced the problem of mastitis and the same has been controlled through the implementation of the project. Table 3 shows the impact of the adoption of mastitis detection and prevention technique as perceived by the scheme beneficiaries.

Table 3

Effect of adoption of mastitis prevention technologies in dairy farming

N=159

S.No	Animal Category	Occurrence of mastitis		Keeping quality of milk (MBRT)		Somatic cell counts	
		Before adoption %	After adoption %	Before adoption	After adoption	Before adoption	After adoption
				Minutes		Lakhs /ml	
1.	Cows	9.5	1.5	25.0	60	5.5	4.5
2.	Buffalos	1.4	0.0	15	45	-	-

The beneficiaries reported that there was reduction in the occurrence of mastitis cases both in cows and buffaloes from 9.5 per cent to 1.5 per cent and 1.4 per cent to nil, respectively, after adoption of the mastitis detection, prevention and control techniques. This indicates that the mastitis prevention and control technology in dairy cattle and women participatory OFT methodology was highly effective. Likewise occurrence of teat cracks and warts had also reduced to nil. Riekerink et al., (2010) reported that most of Canadian dairy farms adopted important mastitis-prevention practices, such as post-milking teat disinfection and drying off all cows with antibiotics.

Table 4

Antibiotic sensitivity pattern of milk samples collected from the beneficiaries (n=19)

Type of reaction	Name of the antibiotics					
	Ofloxacin	Tetracycline	Gentamycin	Ciprofloxacin	Ampicillin	Cotrimoxazole
Sensitivity	13	17	15	2	1	2
Resistance	6	2	4	17	18	17
Per cent sensitive	68.42	89.47	78.94	10.52	5.26	10.52

There was report of only a few cases of mastitis OFT villages, out of 200 beneficiaries rearing dairy cattle. Table 4 shows the antibiotic sensitivity pattern of infected milk samples. The results indicated that the mastitic pathogens were sensitive to Oflaxacin, Ciprofloxacin, Tetracycline and Gentamycin. These results were communicated to the women beneficiaries and they were advised to treat the animals according to the antibiotic sensitivity with the help of veterinarians. They have treated at the earliest thus prevented severe economic loss.

Interestingly, the keeping quality of milk was also improved by increase in Methylene blue dye reduction time (MBRT) of 25 minutes to one hour for cow milk and from 15¬ minutes to 45 minutes for buffalo milk. The microscopic examination of the milk samples revealed that there was significant reduction in the somatic cell count (1 lakh less) of milk of both cows and buffaloes.

The OFT result demonstration meetings were conducted in all the 10 villages with the participation of local leaders, officials from various development departments, NGOs and farmers. The beneficiaries shared their experience on what they gained from the project and the impact created by the scheme with the non-¬participants in the selected villages.

CONCLUSION

An OFT involving women was conducted to reduce the incidence of mastitis in dairy cattle. The women were trained on mastitis detection and inputs required for the diagnosis were given to them. They reported that there was reduction in the occurrence of mastitis cases both in cows and buffaloes from 9.5 per cent to 1.5 per cent and 1.4 per cent to nil respectively after imparting knowledge and skills on the mastitis detection and control techniques. Later the women dairy farmers have conducted trials in their own dairy farms under the supervision of scientists. The keeping quality of milk has also improved from increase in Methylene blue dye reduction time of 25 minutes to one hour for cow milk and from 15 minutes to 45 minutes for buffalo milk. There was one lakh reduction in the somatic cell content of

milk of cows and buffaloes by the adoption of the technologies.

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