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Economic Losses due to Subclinical Mastitis in Dairy Animals: A Study in Bidar District of Karnataka

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Abstract

A total of 421 pooled milk samples from zebu/*desi* cows, crossbred cows and buffaloes were screened to study the incidence rate and economic losses due to subclinical mastitis (SCM) in 10 villages of two blocks under the World Bank funded, Karnataka watershed Development Department sponsored - Sujala III project during last two years. Nine out of 421 samples (2.13%) were found positive for SCM by CMT. The economic losses due to subclinical form of mastitis were estimated in the range of INR 21,677/- to INR 88,340/- pre animal for a lactation period. The study found that incidence of SCM was also related to managemental practices followed by dairy farmers.

Key Words: Mastitis, Sub-clinical mastitis, Economic loss, management practices, Bidar, Sujala project

Introduction

Among the animal diseases which affect the profitability of rearing animals, mastitis is considered to be one of the expensive diseases in terms of production losses (Bardhan, 2013). The losses are the potential revenues not earned, while the control costs are actual expenditures related to treatments, preventive measures, and additional labour used by them (McInerney *et al*., 1992). Scanty literature is available on subclinical mastitis (SCM) in which visible abnormalities such as udder swelling, hardness of the affected quarter, pain, and watery milk remain absent. SCM is of great economic importance to dairy farmers because it results in reductions in milk yield and undesirable changes in the milk's composition, as well as increased costs associated with control strategies (Halasa *et al*., 2009). With this background, the present study was undertaken to analyse the incidence and economic losses due to such kind of infections.

Materials and Methods

The present investigation was designed to study the incidence rate and economic losses due to SCM in the project villages of World Bank funded, Karnataka water shed Development Department sponsored - Sujala III project, implemented by Veterinary College, Bidar (Karnataka) during last two years, viz., 2015-16 and 2016-17. A total of 421 pooled milk samples from zebu/*desi* cows, crossbred cows and buffaloes were screened in 10 project villages of two blocks which were identified by Government of Karnataka in Bidar district.

Among the 421 pooled samples, nine samples (2.13%) were found positive for California Mastitis Test (CMT) at field condition and those positive samples were screened for antibiotic sensitivity test (ABST). Further, the positive samples were treated based on the results of ABST. Information on different categories of animals affected was collected and incidence rate was calculated during that specified time period. Minimum 15 days' milk yields before and after the treatment were recorded to know the variation in milk yield. For calculating the losses due to the disease, information on average daily milk yield, price of milk per liter, reduction in milk yield during the affected period, number of days of illness, discarded milk during affected periods, veterinary expenses, labour charges, stall hygiene, and milk hygiene was collected from the sample farmers. The loss of milk during treatment period was calculated by the difference between average milk potential of each animal before and after treatment and it was multiplied by prevailing milk price to arrive at value of milk loss due to the disease. Further, for quantification and aggregation of economic losses due to incidence of the disease owing to reduction in milk yield, additional resources used, and expenditures made for treatment/prevention the following equation of Singh (2009) was used:

Loss per animal = {(Mi Pm +Ct) D + (V-Vd)},

where D is average duration of the infection; Mi is milk loss per animal per day; Pm is price of milk per litre; Ct is cost of treatment and prevention per animal per day; V is market value of adult animal; and Vd is market value of affected animal.

A semi-structured pretested interview schedule was prepared and employed for collecting data about management practices followed by the animal owners of positive animals in relation to SCM. The information collected through interview was analyzed using the statistical tools frequency and percentage and the results were discussed accordingly.

Results and Discussion

Antibiotic sensitivity pattern of positive milk samples collected from the beneficiaries

Table 1 shows the antibiotic sensitivity pattern in the form of highly sensitive, moderately sensitive and resistant for infected milk samples in the study area. These results were communicated to the project beneficiaries and their animals were treated by the project staff as per antibiotic sensitivity with the help of veterinarians.

Table 1. ABST pattern of milk samples collected from the beneficiaries of positive samples

S. No	Village	Higher Sensitivity	Moderately Sensitivity	Resistant
1	Ballur	• Enrofloxin, • Cefoperazone+ Sulbactum	• Oxytetracycline	• Pencillin-G • Amoxyclin+ Sulbactum • Amikacin
2		• Enrofloxin • Oxytetracyclin	Nil	• Pencillin-G • Ampicillin+ Cloxacillin • Ceftraxone +Sulbactum • Cefperazone + Tazobactum
3		• Enrofloxin	• Oxytetracycline • Cefperazone+ Tazobactum	• Pencillin-G • Ampicillin+ Cloxacillin • Amoxyclin+ Sulbactum
4	Udbal	• Enorfloxin • Ciprofloxin	• Gentamicin • Amikacin	• Pencillin-G • Ceftraxone +Sulbactum
5		• Enorfloxin • Gentamicin	• Ciprofloxin	• Pencillin-G • Ceftraxone +Sulbactum • Amoxyclin+ Sulbactum

6	**Udbal Wadi**	• Ciprofloxin • Cefoperazone+ Sulbactum	• Ampicillin+ Cloxacillin	• Pencillin-G • Oxytetracycline
7		• Ciprofloxin	• Gentamicin • Oxytetracyclin	• Cefoperazone + Sulbactum • Pencillin-G
8		• Enrofloxin • Ceftraxione + tazobactum	• Pencillin-G	• Amoxyclin+ Sulbactum • Ampicillin+ Cloxacillin
9	**Koutha**	• Ciprofloxin	• Cefoperazone + Sulbactum • Gentamicin	• Oxytetracycline • Amikacin • Ceftraxone+ sulbactum

Economic Losses due to SCM in Dairy Animals

Although, it is very difficult to generalize and compare the losses across the farms, an effective extension service is needed to create awareness about the requirements of proper hygiene and adoption of other preventive measures by the rural farmers to reduce the losses due to SCM incidence.

Table 2 presents the economic losses due to incidence of the disease, besides reduction in milk yield, various antibiotics, anti-inflammatory drugs, and intra mammary infusions used for treating affected animals. The economic losses due to subclinical form of mastitis were assessed in the study area and the total loss was in the range of INR 21,677/- to INR 88,340/- for one lactation period depending on the condition of the animal. Almost similar types of losses were reported by Sinha *et al.* (2014). Highest incidence of SCM was observed in crossbred cows due to more

Table 2: Economic losses due to Sub-clinical mastitis in the study area (n=9)

Name of the village	Positive Animals	Average duration of the infection (D)	Milk loss per animal per day (Mi)	Price of milk per litre (Pm)	Cost of treatment & Prevention per animal per day (Ct)	Market value of adult animal (V)	Market value of affected animal (Vd)	Economic losses per animal (INR)
Ballur	CB Cow	60 days	1 liter	22	1167	45000	28000	88,340/-
Ballur	CB Cow	40 days	1 liter	22	969	42000	28000	53,640/-
Ballur	Buffalo	32 days	1 liter	34	875	55000	35000	49,088/-
Udbal	CB Cow	25 days	1 liter	23	1067	41000	29500	38,750/-
Udbal	Buffalo	28 days	1 liter	36	1164	48000	32500	49,100/-
Udbal Wadi	CB Cow	21 days	2 liter	24	389	43000	30500	21,677/-
Udbal Wadi	CB Cow	32 days	1 liter	20	587	37000	27000	29,424/-
Udbal Wadi	Buffalo	27 days	2 liter	28	436	58000	34500	36,784/-
Koutha	CB Cow	48 days	1 liter	22	900	42000	28500	57,756/-

susceptibility to the disease. Our reports corroborate with the reports of Sharma (2003). Further, less incidence of the disease in buffaloes might be due to the thick and compact epithelium, thick keratin layer, and thick muscle sphincter in streak canal of udder of buffaloes as compared to crossbred cows.

Relationship between Management Practices and Incidence of SCM

The relationship between some managemental practices and incidence of SCM was also studied. Table 3 indicates that incidence of SCM was more in animals maintained in animal house with *Kuchcha* floor than concrete floor. With regards to animal shed hygienic practices, it was found that less hygienic animal shed favoured the higher incidence of SCM in dairy animals.

Table 3: Relationship between management practices and incidence of SCM (n=9)

Practices		Frequency	Percentage
Type of flooring	Concrete floor	02	22.23
	Kuchcha floor	07	77.77
Animal shed-hygiene	Hygienic	01	11.12
	Less hygienic	08	88.88
Milk-man's hygiene	Hygienic	01	11.12
	Less hygienic	08	88.88
Method of milking	Full hand	01	11.11
	Stripping	03	33.33
	Knuckling	05	55.56
System of rearing	Intensive	07	77.77
	Semi intensive	02	22.23
	Extensive	00	00
Existence of suckling calves	Presence	06	66.67
	Absence	03	33.33

Further, poor hygiene of milk-man in terms of health condition, zoonotic diseases, clean clothing, proper hand washing before and after milking with antiseptic solution, also caused SCM in the dairy animals. With regards to method of milking, full hand method was better than other methods while striping and knuckling method caused more damage to the teat tissues leading to more prone to SCM. Similar result was also reported by Sudhan and Sharma (2010). Further, the study also revealed that presence of suckling calves increased SCM incidence than absence of suckling calves. The result was in agreement with Sharif and Muhammad (2009) stating that during suckling the pathogens might get entry into teats and often damages the udder leading to develop the disease. In similar lines, Rathod *et al.* (2014) have also indicated that there is poor adoption of scientific practices by the farmers in the study area.

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Conflict of Interest: All authors express no conflict of interest.

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