Study on Prevalence of Sub-Clinical Mastitis in Crossbred Dairy Cattle and its Potential Risk Factors

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ABSTRACT

The study was designed to determine the prevalence of sub-clinical mastitis in cross-bred dairy cattle and potential risk factors associated with the disease. The study was conducted in organized dairy farm at Jammu, and milk samples collected from 106 animals were put to MCMT (Modified Californian Mastitis Test). The overall prevalence of sub-clinical mastitis was found to be 59.43 per cent (%) and quarter level prevalence was at 34.78%. The risk factors under study; parity, age, milk yield and position of quarters, had significant influence on prevalence of sub-clinical mastitis. Prevalence was high in animals with greater than 20 litre (77.41%) of milk yield, and those falling in age group of greater than 8 years (82.92%). In relation to parity of animals and position of quarters, prevalence was maximum in six and above parity animals (78.6%), and with regard to position of quarters, mostly right hind quarters (49.39%) were affected. The pathogens isolated were mostly contagious in nature, and *Staphylococcus aureus* (66.67%) was most commonly found organisms.

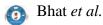**Keywords**: Prevalence, sub-clinical mastitis, risk factors

Mastitis is one of the economically important disease of dairy cattle. It is characterized by inflammatory changes in the parenchyma of the mammary gland, which are manifested as, physical and chemical changes in the milk, and pathological changes in the glandular tissue (Radiostits *et al.,* 2010).

In addition to its economic importance, the disease is of great public health significance, because infected milk may act as a vehicle for spread of certain infections to human beings. The disease may be manifested in sub-clinical and clinical form. In a well managed dairy herd, subclinical mastitis should be efficiently detected. Most of dairy farmers in Jammu division are not aware of sub-clinical mastitis and give no importance to it. Therefore, an early detection of sub-clinical mastitis using suitable field diagnostic aid is very much essential for its successful treatment and control. The objectives of our study were to determine the prevalence of sub-clinical mastitis in organized dairy farm and its potential risk factors.

Milk samples were collected from apparently healthy quarters of lactating crossbred cattle (Cross of Holstein Friesian and Sahiwal) maintained at Army Dairy Farm, Satwari, Jammu. Milking was done by both hand and machine milking. The average milk yield for the animals was 18 (SE=2) liters per day per animal.

The various risk factors taken into consideration were, age, parity, milk yield and position of quarters. Data related to all these parameters was collected from the farm records.

Milk samples from individual quarters of cows were taken after washing the udder with antiseptic solution for visible debris, and teat ends were scrubbed with cotton soaked in spirit. The milk samples were subjected to Modified Californian Mastitis Test (MCMT) interpreted as 0 (negative), T (trace), 1+, 2++, or 3+++, depending on degree of gel formation (Pandit and Mehta, 1969).

The data was analysed for statistical significance P<0.05% of the association between predisposing risk factors like age, parity, position of quarter and milk yield with

prevalence of sub-clinical mastitis using Chi-square test (Snedecor and Cochran, 1989).

Out of 106 cross bred dairy cattle screened for sub clinical mastitis by Modified Californian mastitis test (MCMT), 59.43% were found positive. The quarter level of prevalence was found to be 34.78 (%) (Table 1).

The study underscored the effect of potential risk factors on prevalence of sub-clinical mastitis. All the risk factors considered, namely parity, milk yield age and position of quarter, had significant effect on the prevalence of sub clinical mastitis.

The prevalence of sub-clinical mastitis was highest in animals falling in six or above parity (78.6%) and in animals having milk yield greater than 20 litres (77.41%). With regard to position of quarters and age of animals, prevalence was highest for animals falling in age group of greater than 8 years (82.92%) and mostly right hind quarters (49.39 %) were affected, followed by right fore (40.90%), left hind (28.04%) and least for left fore quarters (21.72%). (Table 2).

Cultures grown on selective media showed thirty four isolates positive for *Staphylococcus aureus* (66.67 %), eight isolates were found of *Coagulase Negative Staphylococci* (15.68 %), seven of *Streptococci* sp. (13.72%) and two of *E.coli* (3.92%).

The animal wise and quarter wise prevalence of sub clinical mastitis during lactation in cross bred dairy cattle was found to be 59.43 (%) and 34.78 (%), respectively. Present findings were in concurrence with Bansal *et al.* (1995), who reported the prevalence of subclinical mastitis 48 per cent in cattle and buffaloes of Punjab. Varying results of incidence of sub clinical mastitis, ranging from 29 per cent to 97 per cent, have been reported by different workers (Nickerson *et al.*, 1995; Nath and Dutta, 2007; Junaidu *et al.*, 2011 and Sharma *et al.*, 2012). This variation in prevalence of mastitis could be attributed to difference in breeds, farm management, level of production and differences in study methods for studying mastitis employed by the investigators.

Radostits *et al.* (2010) emphasized that generally the incidence peaks at 7 years of age. Present findings were in agreement with other workers (Saini *et al.*, 1994; Mitra *et al.*, 1995; Sudhan *et al.,* 2005; Tiwari *et al.*, 2008). The increase in prevalence with parity and age, could be due to gradual loss in immune function of body with age, which predisposes animals to infection. It may also be ascribed to loosening of sphincter and patency of teat canal in older cows. Moreover, the median ligaments which provide support to the teat also get relaxed with age, leading to hanging of udder and thus making it more prone to mastitis.

The prevalence in relation to position of quarters was highest for right hind quarters (49.39 %) and least for left fore quarters (21.72%). Similar results were reported by Saini *et al.* (1994) and Sharma *et al.* (2012). However, contrary to these findings, Khan and Muhammad (2005) reported higher prevalence of mastitis in left sided quarters. The higher prevalence of mastitis on right side quarters could be due to natural tendency of cows to sit on right side, which results in frequent exposure of quarters to dung, soil and injuries. Further due to pressure of animal body on quarters, the milk dribbles out through the teat of high yielders, thus increasing their susceptibility to mastitis. Prevalence of sub clinical mastitis was maximum in animals with milk yield greater than 20 litres. These results were in agreement with Mureithi and Njuguna (2016), who reported the prevalence of sub clinical mastitis as 66.7 % in animals producing greater than fifteen litres of milk. The stress produced by over production and increased loss of micronutrients that have role in immunity, may predispose animals to intra-mammary infections. Further a genetic correlation has been found between milk yield and causation of mastitis in dairy cattle.

CONCLUSION

The animal wise and quarter wise prevalence was recorded as 59.43 % and 34.78 %, respectively. Maximum prevalence was reported for animals in above six parity, and in age group of greater than 8 years. *Staphylococcus aureus* was the highly prevalent microorganism isolated from both sub clinical mastitis followed by *Streptococcus* and *E.coli.*

Table 1: Cow wise and quarter wise prevalence of sub clinical mastitis

Cases/Number	Total Number	Positive	Percent (%)
Animals	106	63	59.43
Quarters	345	120	34.78

Table 2: Risk factors and their association with prevalence of sub clinical mastitis

S. No.	Risk Factor	Groups	Examined (No.)	Affected (No.)	Percent Prevalence (%)	p-value
1	Position of Quarter	Left fore	92	20	21.72	0.000491
		Right fore	82	33	40.90	
		Right hind	83	41	49.39	
		Left hind	88	25	28.04	
2	Parity of animals	First parity	15	5	33.33	0.01572
		Second parity	14	6	42.85	
		Third parity	20	9	45	
		Fourth parity	9	6	66.66	
		Fifth parity	20	15	75	
		Sixth & above	28	22	78.6	
3	Milk Yield	0-10 litres	39	15	38.46	0.00245
		10-20 litres	36	24	66.67	
		> 20 litres	31	24	77.41	
4	Age in Years	3 – 5	32	15	46.87	0.000454
		5-8	33	14	42.2	
		> 8	41	34	82.92	

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