

SUBCLINICAL BOVINE MASTITIS IN MUZAFFAR GARH DISTRICT OF PUNJAB (PAKISTAN)

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ABSTRACT

The present study was carried out to determine the quarter-wise and animal-wise prevalence of sub-clinical mastitis in crossbred cows in four tehsils i.e., Muzaffar Garh, Kot Addu, Ali pur and Jatoi of District Muzaffar Garh of Punjab. Milk samples were collected from apparently mastitis free 2000 quarters of 500 crossbred cows. The samples were subjected to Surf Field Mastitis Test (SFMT). The overall quarter-wise prevalence was 35.25% while animal-wise prevalence was 36%. The maximum quarter-wise prevalence was found to be 9% in tehsil Jatoi followed by 7, 8 and 7.8% in the tehsils Muzaffar Garh, Kot Addu, and Ali pur, respectively. While the maximum animal-wise prevalence was 60% in tehsil Jatoi followed by 48, 41.6 and 30.4% in the tehsils Muzaffar Garh, Kot Addu and Ali pur, respectively.

Key words: crossbred cows, sub-clinical mastitis, Surf Field Mastitis Test

INTRODUCTION

Bovine mastitis is one of the most problematic diseases and continues to have major economic impact on the dairy industry throughout the world (Dodd, 1983). It is a global problem, characterized by physical, chemical and microbiological changes in the milk and pathological changes in the glandular tissue of the udder. Mastitis is recognized as the most important and costly disease of dairy animals (Lightner *et al.*, 1988; Ali *et al.*, 1989). This disease also poses the risk for the transmission of major zoonotic diseases like tuberculosis, brucellosis, leptospirosis and streptococcal sore throat to human beings (Radostits *et al.*, 2000).

In the sub-clinical mastitis all the five cardinal signs of udder inflammation (redness, heat, swelling, pain and loss of milk production) are present, while the sub-clinical form is bereft of any manifestation of inflammation. In USA, sub-clinical mastitis is responsible for 60-70% of total economic losses associated with all mastitic infections (Merrill and Galton, 1989). Mastitis represents a serious problem to be considered due to the economic losses for which it is responsible (Ahmad, 2001). Field Surveys of major livestock diseases in Pakistan have indicated that mastitis is one of the most important health hazards in the country (Cady *et al.*, 1983). The losses due to mastitis might be higher in Pakistan because the mastitis prevention practices like teat dipping and dry period antibiotic therapy are not in practice (Arshad, 1999).

Since there is no gross swelling of quarters or abnormality of milk, sub-clinical mastitis is recognized by laboratory examination of milk or animal-side tests.

The common farmers are not so much familiar with these techniques. So the present study was conducted to determine the quarter-wise and animal-wise prevalence of sub-clinical mastitis in crossbred cows in four tehsils i.e., (Muzaffar garh, Kot Addu, Alipur and Jatoi) of Muzaffar garh district of Punjab, Pakistan, using an easy animal-side test viz., Surf Field Mastitis Test (SFMT). SFMT has already been used by different scientists in their studies like Bachaya *et al.*, 2005; Khan and Muhammad, 2005; Sharif and Ahmad, 2007; Ali *et al.*, 2010; Muhammad *et al.*, 2010, for the prevalence of sub-clinical mastitis in different species of animals.

MATERIALS AND METHODS

The study area, district Muzaffar garh is situated between two rivers mighty Indus and Chenab. According to Livestock Census 2006, the District is first in the Punjab as far as cattle population is concerned (Anonymous, 2006), so this District is called the "Land of Cattle" amongst, crossbred cows are more in population. Therefore, crossbred cows were used for this study.

Milk samples from apparently mastitis free 2000 quarters of 500 cows were collected aseptically. The samples were subjected to Surf Field Mastitis test (SFMT). The principle of the test is that when detergent is added into milk sample, it causes rupture of somatic cell and release DNA and other cell contents. DNA is acid in nature, while detergent contains alkyl-aryl-sulfonate, which is basic in nature. DNA and detergents unite to form a gel, consistency of gel depends upon the number of somatic cells. More cells more thick gel and

vice versa. For this purpose, three percent surf solution (pH = 10.3) was prepared by adding three grams of commonly used detergent powder (Surf Excell[®], Lever Brothers, Pakistan) in 100 mL of water. Quarter milk samples and surf solution were then mixed in equal quantities in petri-dishes separately for each quarter. The change in consistency of milk indicated mastitis, while no change in consistency of milk indicated healthy samples. The mastitis was graded into further four categories based on the severity of disease from lower to higher intensity as, + = moderate, ++ = severe, +++ = more severe, ++++ = very severe (Muhammad *et al.*, 1995; Fazal-ur-Rehman, 1995). The prevalence was calculated as described by Thrusfield (1986) and percent result was calculated.

RESULTS AND DISCUSSION

Quarter-wise and animal-wise prevalence of sub-clinical mastitis in crossbred cows in Muzaffar garh District of Punjab using SFMT has been shown in the Table-1 and Table-2, respectively. The quarter-wise prevalence was found to be 35.25 percent while animal-wise prevalence was 45 percent. A previous study has shown quarter-wise and animal-wise prevalence of mastitis as 64 percent and 30.5 percent, respectively in buffaloes (Fazal-ur-Rahman, 1995). While herd-mate animals had shown higher prevalence of sub-clinical mastitis in buffaloes (75 percent) and individually managed animal as 44.44 percent.

Said and Malek (1968) reported a prevalence of 38.07 percent in buffaloes on the basis of White Side test and California Mastitis Test. Hashmi and Munir (1981) used cultural examination and reported a figure of 44.9 percent for buffaloes. Rehman *et al.* (1983) reported a prevalence of 59.2 percent and 36.8 percent of sub-clinical mastitis in cows and buffaloes, respectively on the basis of Direct, Indirect and cultural examination. Hussain *et al.* (1984) observed the prevalence of 33 percent in cows and 8 percent in buffaloes on the basis of results of White Side test. Shah (1987) used Ciba-Geigy Mastitis Test and found that 34.48 percent buffaloes suffered from sub-clinical mastitis.

Anwar and Chaudhry (1983) have reported a prevalence of 47.5 percent in buffaloes after using Strip Cup test, pH test and White Side test. Bachaya *et al.* (2005) also reported that overall quarter-wise prevalence was 44.1% while animal-wise prevalence was 44% in cows on the basis of Surf Field Mastitis Test. Khan and Muhammad (2005) observed the overall prevalence of sub-clinical mastitis 27% in buffaloes and 36% in crossbred cows by using Surf Field Mastitis Test and microbiological examination of milk.

The difference in prevalence of sub-clinical mastitis observed in the present and previous studies may be due to differences in management practices, methods

of detection, breeds of the animals, immune response of animals and climatic conditions. Extreme weather favours the problem and creates stress to the body, hence immunity decreases, leading to increased sub-clinical incidence associated with contagious and environmental mastitogens. Various previous studies (Hoar and Roberts, 1972; Prost, 1984; Faull *et al.*, 1985) indicated that good management conditions reduce the incidence of mastitis to a great extent. Nickerson (1990) reported that proper milking procedure is important to reduce the incidence of mastitis. The studied factors were determined as risk factors affecting mastitis as breed (Bendixen *et al.*, 1988), season, age (Hultgren 2002), management, environment (McDougall, 2003) and hygiene (Ward *et al.*, 2002).

Table I: Quarter-wise prevalence of sub-clinical mastitis in crossbred cows in 4 tehsils of District Muzaffar Garh

Area	Total quarters tested	Affected quarters		One positive quarters		Two positive quarters	
		No.	%age	No.	%age	No.	%age
Muzaffar garh	500	180	36	145	29	35	7
Kot Addu	500	150	30	110	22	40	8
Alipur	500	135	27	96	19.2	39	7.8
Jatoi	500	240	48	195	39	45	9
Over all affected quarters =		35.25%					

Table II: Animal-wise prevalence of sub-clinical mastitis in crossbred cows in 4 tehsils of District Muzaffar Garh

Area	Animal tested	Affected animals	Affected % age
Muzaffar garh	125	60	48
Kot Addu	125	52	41.6
Alipur	125	38	30.4
Jatoi	125	75	60
Over all affected animals =		45%	

The milk samples from udder quarters affected with sub-clinical mastitis showed floccules or gel formation when subjected to SFMT. In a previous study, quarter-wise milk samples from apparently normal healthy animals were examined by Surf Field Mastitis Test to determine the prevalence of mastitis (Muhammad *et al.*, 1995) Present study focused on determining the percentage of sub-clinically affected animals. Gel formation was divided into four categories i.e. + = moderate, ++ = severe, +++ = more severe, ++++ = very severe. Only first two conditions were present, while other two were absent (Table 1).

In the sub-clinical mastitis, the most important factor affecting somatic cell count in milk is mammary

gland infection (Eberhart *et al.*, 1979; Reneau, 1986). Inflammation of mammary glands increases the number of somatic cells in milk. When milk from sub-clinically mastitic quarters is mixed with anionic detergent solutions such as CMT or SFMT reagent, a chemical reaction causes the gel formation (Schalm *et al.*, 1971). Ideally milk from all four quarters should be tested separately. Mastitic milk is unwholesome for human consumption due to the presence of bacteria and their toxins, as well as high number of white blood cells or somatic cells (Barlett *et al.*, 1990; Harmon, 1994).

There is high prevalence of mastitis in dairy cows in our field conditions, which ultimately reflects the bad quality of milk available to the consumers. This is due to the following reasons. Regular screening tests for sub-clinical mastitis are not practiced in the field by the farmers. As mastitis is managerial problem and mastitis prevention practices like dry cow therapy, pre and post-milking teat dip are not practiced at most of the milking sheds. Most common pathogens of mastitis are contagious, at the time of milking these pathogens are exposed to non-mastitic animals from milkers' hands, because no preference of milking non-mastitic animals first is done. Milking procedure in our conditions is accompanied with unhygienic conditions and the teats are exposed to injury with inverted thumb method of milking. There is close contact between healthy and diseased animals in common grazing and wallowing places. As weaning is not practiced so un-weaned calves often cause injury to the udder and create a focus for infection, the calves cause injury, because of biting, pulling and hitting the udder. While open grazing in the field the large, pendulous and hanging udders are often exposed to injury and infection develops.

Recommendations: Teats should be clean and washed with an effective germicidal chemical to avoid the spread of Mastitis. All the quarters of cows should be treated at drying off with antibiotics. Proper milking procedure should be practiced. Mastitic animals should be kept and milked separately. After milking the animal should not be allowed to sit immediately, because after milking the teat sphincter remain open for some time and if animal sits at that time there are maximum chances of infection due to contact of teat with un-hygienic places. Regular screening of mastitis should be done. Chronically infected animals, who do not respond to the treatments, should be culled out from the herds. The cases of mastitis can be reduced to an appreciable extent and the production can be increased by adopting following management measures on priority basis, i. Preventing the calf to cause any injury on teat / udder, ii. Full hand milking should be practiced, iii. Keeping the animals on wet and dirty floors should be discouraged, iv. Pacca floor must be even and properly bedded, v. Non-infected animals should be milked ahead of infected ones vi. Using a simple screening test like

SFMT, farmers should test the dairy animals before purchasing, if positive, avoid buying such animals.

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