

## Short Communication

**A population based active disease surveillance of mastitis in cattle**

Ghulam Murtaza Arshad<sup>a</sup>, Muhammad Ali Shah<sup>b</sup>, Khawar Ali Shahzad<sup>c</sup>, Azhar Maqbool<sup>a</sup>, Athar Ali Khan<sup>a\*</sup>

<sup>a</sup>University of Veterinary and Animal Sciences, Lahore

<sup>c</sup>Department of Pathobiology, Arid Agriculture University, Rawalpindi, 54000, Pakistan

<sup>c</sup>University of Lahore, Lahore, 54000, Pakistan

**Abstract**

An active surveillance was conducted in four villages and one private farm to determine the incidence of clinical and subclinical mastitis under field conditions. Total population of breeding age adult female cattle comprised 747 heads. 18.20% was the incidence of clinical mastitis in cattle, while 20, 24.43, 23.91, 25.95 and 26.84% in Private farm, Sial Sharif, 134-S.B., Bhabra and Beerbal Sharif, respectively. In cattle incidence of clinical mastitis at the five farms was 12.5, 17.64, 16.84, 19.44 and 19.88%, respectively. The fore and hind quarters were the regions with 34.34 and 60.78% infection rate of mastitis, respectively. The cases of both quarters affected were in 4.88% cases. The maximum infection rate of mastitis was observed during and after sixth lactation. The incidence of subclinical mastitis in cattle was 29.29%, whereas 20, 33.33, 28.57, 29.41 and 30.55% at five farms, respectively. Due to mastitis, the total economic losses were estimated at Rs. 1, 94,920.00 in all the five clusters, whereas at a farmer level it was Rs.8, 405.00 per annum.

**Key words:** Mastitis, Clinical mastitis, Prevalence, Economic loss, Cattle.

**Received** July 03, 2013; **Revised** August 23, 2013; **Accepted** August 29, 2013

**\*Corresponding author:** Athar Ali Khan E-mail: atharalikhan@uvas.edu.pk

**To cite this manuscript:** Arshad GM, Shah MA, Shahzad KA, Maqbool A, Khan MA. A population based active surveillance of mastitis in cattle. Veterinaria 2013; 1: 18-20.

**Introduction**

Mastitis in dairy animals is a worldwide problem, categorized by physical, chemical and microbiological changes in the milk and pathological changes in the glandular tissue of the udder that can cause the swelling of the udder. Mastitis has been described a major health issue of livestock and resulted as high economic losses in dairy industry. It reduces milk yielding capacity, quality of milk and milk products throughout the world [1-3]. Annual losses because of mastitis were nearly 35 billion US dollars, worldwide [4]. Because of no mastitis preventive practices such as dipping and dry period antibiotic therapy in developing countries like Pakistan, the economic losses must be higher as compared to developed countries [5].

In different regions of Pakistan, the occurrence rate of mastitis has been reported as 20-60% in cattle and buffaloes [6]. An affirmative relationship between mastitis, SCC, low hygienic level in farms and low quality of management has been reported [7].

Mastitis is of two types, the clinical mastitis with five symptoms such as swelling, pain, redness, heat, and loss of milk production, abnormal milk can be detected visually, without any laboratory test. The second type is a subclinical form which is hidden and requires laboratory tests to diagnose. There are no visual changes in milk in case of sub-clinical mastitis. Among both, sub-clinical mastitis more hostile and reported to cause 60-70% of total economic losses even in developed countries, like USA [8].

*Staphylococcus aureus*, *Streptococcus agalactiae* and *Escherichia coli* are the most prevailing pathogens in Pakistan, which are involved in almost 78% cases of mastitis [9, 10]. Major zoonotic diseases such as leptospirosis, streptococcal sore throat, tuberculosis, gastroenteritis and brucellosis can also be transmitted by mastitis [11]. It is required to detect and treat the subclinical udder infections, which can be recognized as an important strategy to the success of any mastitis control program [12].

Sargodha is an agricultural district of the province with the high livestock population and also the significant milk producing district [13]. A total of 22.5% premature culling has been reported out of all culling because of mastitis during a 10 year period in local born and imported Holstein-Friesian cattle [14]. There are some studies for prevalence of mastitis in cows from different parts of the country. However, no study for the area under study has been published yet. The objectives of our study were to know the epidemiological factors such as the incidence of subclinical mastitis by using the surf field mastitis test (SFMT), the incidence of clinical mastitis in both early and late lactation period and in hind and forequarter. Moreover, due to mastitis, overall cost/benefit ratio at farmer level and village has also been calculated.

**Materials and Methods**

Randomly, five villages of district were selected to conduct the present study, with the co-ordination of veterinary medical services provided by veterinary

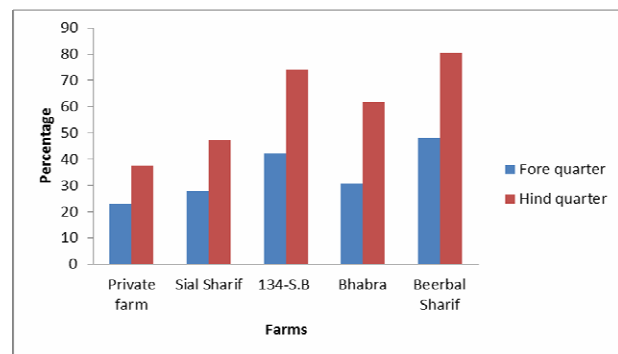
and para-veterinary staff. The villages where the study was conducted were; a village with a veterinary hospital (Sial Sharif), two villages with only facility of veterinary assistant (134-S.B and Bhabra), a village without any veterinary services and private livestock farm in District Sargodha, Pakistan.

All the farms having at least one cow of breeding age were included in our sampling frame. For each village, the surveillance was conducted by visiting each farmer (included in our sampling frame) of the village. Prescribed questionnaire was prepared for data collection, which was based on questions asked from each farmer about mastitis and its effects on the quarter, whether treated or untreated. The data for a period of one year was collected retrospectively.

For the detection of sub-clinical mastitis, from each village about 10% of the farmers were selected randomly. The surf test was performed according to the protocol described by Akhtar et al [1]. Briefly, surf solution (3%) with 10.3pH was prepared by using three grams of commonly used detergent powder (Surf Excell®, Lever Brothers and mixed in 100 mL of distilled water. Milk samples from selected farms were mixed with surf solution in equal quantities in petri-dishes separately for each sample. Gel formation (change in consistency of milk) was indicated that the sample was positive for mastitis while no gel formation was the indication of negative test.

## Results and Discussion

In the present study, the incidence of clinical mastitis in cattle was 18.20%. Ratio of incidence of mastitis in hind and fore quarters is given in Fig. 1.



**Fig. 1: Ratio of incidence of mastitis in hind and fore quarters**

Our findings were in agreement with the results of Saini et al, who reported 17.33% clinical mastitis in cattle [15]. According to studies conducted by Akhter et al animal wise prevalence of subclinical mastitis

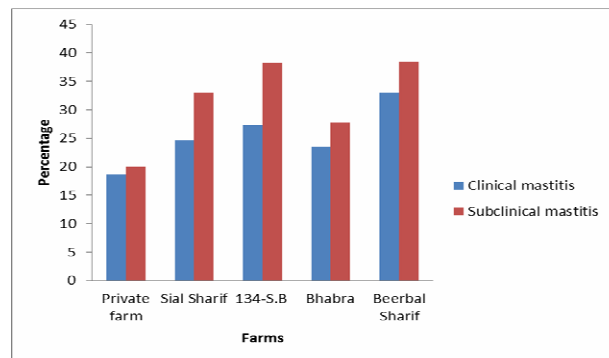
was 29% and clinical mastitis 7% in local cows [1]. The overall occurrence of mastitis in studies conducted by Aftab et al was 32.91% [16]. Our findings were also in agreement with Khan and Muhammad, who recorded 23.59 to 34.5% mastitis cases in milking cows and buffaloes [10]. The lactation number and animal age were the major cause for incidence of mastitis. Mungube et al reported that the risk of subclinical mastitis was significantly higher in cows aged at least 8 years, with a poor body condition and during the 8th month of lactation [17].

Area wise prevalence of mastitis according to its types and position of quarters was calculated and given in Table 1.

**Table 1: Prevalence of mastitis according to its types and position of quarters with reference to age**

Area	Incidence of Mastitis in fore quarter (%)	Incidence of Mastitis in hind quarter (%)	Clinical mastitis ratio (%)	Subclinical mastitis ratio (%)
Private farm	23.2	37.5	18.7	20
Sial Sharif	27.8	47.2	24.7	33
134 SB	42.2	74.1	27.3	38.33
Bhabra	30.6	61.7	23.5	27.77
Beeral Sharif	48	80.5	33	38.46

Our study revealed that the higher incidence of mastitis was in the hind (60.78%) and lower (34.34%) in fore-quarters of cattle. Whereas, the studies conducted by Akhtar et al, quarter wise prevalence of sub-clinical mastitis was 40%, 50% and 47% [18].



**Fig. 2: Ratio of incidence of clinical and subclinical mastitis**

Improvement of management conditions such as water exposure to udder and bedding etc., veterinary medical facilities and educational status of the farmers can decrease the incidence of clinical mastitis in cattle. Studies conducted by Prost, concluded that the incidence of clinical mastitis was decreased by improving conditions like building, general animal health and milking method [19]. Kivaria et al reported that single udder-towel, dairy laborers, water dearth, barn size and residual suckling were the most substantial ( $p < 0.05$ ) risk indicators [20].

The incidence of subclinical mastitis was 29.29% in cattle. In a study conducted by Khan and Muhammad, total 36% quarters were affected with subclinical mastitis in cows [10]. Yeruham et al reported the sub clinical mastitis was diagnosed 28.8% (17 of 59) in cows [21]. Ratio of incidence of clinical and subclinical mastitis is shown in Figure 2.

In conclusion, the higher incidence of mastitis was found in hind and fore quarters of cattle. In a private livestock farm where management condition like wet bedding and exposure of udder to water was minimal the incidence of clinical mastitis in cattle was significantly as compared to cattle kept by the farmers in the villages.

## References

- [1] Akhtar A, Khairani-Bejo, Umer, Tanweer AJ, Habibullah. Prevalence of mastitis and identification of causative pathogens in local and crossbred cows in Dera Ismail Khan. *Pak J Sci* 2012; 64(3):265-268.
- [2] Bachaya A, Raza MA, Murtaza S, Akbar IUR. Subclinical bovine mastitis in Muzaffar Garh district of Punjab (Pakistan). *The J Anim Plant Sci* 2011; 21(1):16-19.
- [3] Yousaf M, Muhammad G, Bilal MQ, Firyal S. Evaluation of non-antibiotics alone and in combination with cephradine in the cure rates in clinical bubaline mastitis. *The J Anim Plant Sci* 2012; 22(3):207-211.
- [4] Getahun K, Kelay B, Bekana M, Lobago F. Bovine mastitis and anti-biotic resistance patterns in Selalle smallholder dairy farms, central Euthopia, *Trop Anim Health Prod* 2008; 40: 261-268.
- [5] Arshad GM. A population based active disease surveillance and drug trails of mastitis in cattle and buffaloes of District Sargodha. MSc Thesis, Deptt: Vet. Clinical Medicine and Surgery, Univ Agri, Faisalabad, Pakistan (1999).
- [6] Chishty MA, Arshad M, Avais M, Ijaz M. Cross-sectional epidemiological studies on mastitis in cattle and buffaloes of Tehsil Gojra, Pakistan. *Buffalo Bulletin* 2007; 26:50-55.
- [7] Koivula M, Mantysaari EA, Negussie E, Serenius T. Genetic and phenotypic relationships among milk yield and somatic cell count before and after clinical mastitis. *J Dairy Sci* 2005; 88: 827-833.
- [8] Merrill WG, Galton DM. Mastitis and its control. In: *Milk Quality: A Pro-Dairy Management Focus Workshop for Farm Managers*, Cornell University, New York, USA (1989).
- [9] Ahmad R. Studies on mastitis among dairy buffaloes. *Pak Vet J* 2001; 21(4):220-221.
- [10] Khan Z, Muhammad G. Quarter-wise comparative prevalence of mastitis in buffaloes and crossbred cows. *Pak Vet J* 2005; 25(1):9-12.
- [11] Radostits OM, Blood DC, Gay CC. *Veterinary Medicine*, 8th Ed., Bailliere Tindall, London, 1994; pp: 563-614.
- [9] Arshad GM, Ali M, Shah A, Khan MA, Maqbool A, Xiaokai S, Iqbal MF, Raza W, iangrui L. A population based active disease surveillance of and mastitis response to antibiotics in buffaloes. *J Anim Plant Sci* 201; 22(4):397-402.
- [13] Government of Pakistan. *Pakistan Economic Survey*. Ministry of Finance, Islamabad, Pakistan (2005-2006).
- [14] Sammiullah, Syed MUD, Arif M, Khan M. Frequency and causes of culling and mortality in Holstein Friesian cattle in NWFP (Pakistan). *J Anim Health Prod* 2000; 20: 22-24.
- [15] Saini SS, Sharma JK, Kwatra MS. Prevalence and etiology of subclinical mastitis among crossbred cows and buffaloes in Punjab. *Ind J Dairy Sci* 1994; 47(2):103-106.
- [16] Aftab AA, Muhammad FQ, Muhammad AA, Muhammad U, Tariq MK. Bacteriology of mastitic milk of cattle and In Vitro antibiogram of the pathogens isolated, in District Hafizabad, Pakistan. *PK ISSN 0006-3096; Biologia (Pakistan)* 2010; 56:117-122.
- [17] Mungube EO, Tenhagen BA, Kassa T, Regassa F. Kyle MN, Greiner M, Baumann MP. Risk factors for dairy cow mastitis in the central highland of Ethiopia. *Trop Anim Health Prod* 2004; 36(5):463-472.
- [18] Akhtar A, Habibullah, Ameer M, Hidayatullah, Aeshad M. Prevalence of sub clinical mastitis in buffaloes in District D.I.Khan. *Pak J Sci* 2012; 64 (2):159-160.
- [19] Prost J. Influence of environmental factors on the occurrence of bovine mastitis and the implementation of some control measures. *Polskie A schium Weterynaryne*, 1984; 24(1):97-116.
- [20] Kivaria FM, Noordhuizen JP, Kapaga AM. Risk indicators associated with subclinical mastitis in smallholder dairy cows in Tanzania. *Trop Tnim Health Prod* 2004; 36(6):581-592.
- [21] Yeruham I, Schwimmer A, Bami Y. Epidemiological and bacteriological aspect of mastitis associated with yellow-jacket wasps (*Vespula germanica*) in dairy cattle herd. *J Vet Med B Infect Dis Vet Public Health* 2002; 49(10):461-463.