EPIDEMIOLOGICAL STUDIES ON SOMATIC CELL COUNT AND SUBCLINICAL MASTITIS IN BUFFALOES OF PUDUCHERRY, INDIA

B. Subhash Chandra, K. Rajkumar*, P. Vijayalakshmi, A. Abiramy Prabavathy, D. Selvi and B. Subramanian

ABSTRACT

The present study was conducted to investigate the normal somatic cell count (SCC), associated factors in hygienic management and to define subclinical mastitis in buffaloes in Puducherry. Samples were collected from 50 clinically normal buffaloes stationed at different farms of Puducherry region. Somatic cell count was measured for all the milk samples using Newman-Lampert staining technique. The upper limit of SCC was determined as ≥2, 00,000/ml of milk based on the mean ± 2SD of a total SCC. California mastitis test (CMT) was conducted for all the animals. In the present study subclinical mastitis was diagnosed on the basis of samples with SCCs ≥ 2, 00,000/ml. In the present study 96% of the milk samples were negative for California mastitis test (CMT). The SCC of CMT positive quarter was significantly higher (P<0.01) than CMT negative quarters. Subclinical mastitis was found only in three buffaloes in the present study. Somatic cell counts were significantly higher in the buffaloes with subclinical mastitis. Regarding the hygiene, all the farms had poor management and improper housing. Proper education on hygienic management is need of the hour for buffalo owners of Puducherry region.

Keywords: buffalo, *Bubalus bubalis*, buffalo milk, subclinical mastitis, somatic cell count, California mastitis test (CMT)

INTRODUCTION

Mastitis is the inflammation of the parenchyma of the mammary gland regardless of the cause (Radostits, 2007). Both livestock and farming community are seriously affected by mastitis since the production and the nutritive value of the milk are reduced from moderate to drastic depending on the severity. The composition and the yield of the milk are affected by the mastitis (Patil *et al*., 2015). Mastitis is an important disease which influences the quality and quantity of milk. Leakage of protein, ions and enzymes from the blood due to an increased permeability, phagocytising cells invasion into the milk, decrease in the synthetic capacity of the gland, which results in decreased concentration of certain milk constituents (Korhonen and Kaartinen, 1995). Pathogenic micro-organisms penetration in the teat canal causes inflammatory response and changes in the milk (Sharif *et al*., 2008). *S. aureus* is considered as predominant agent in causing mastitis (Mehwish *et al*., 2015). It is recognized as

Department of Veterinary Medicine, Teaching Veterinary Clinical Campus, Rajiv Gandhi Institute of Veterinary Education and Research, Puducherry, India, *E-mail: rajvet10@gmail.com

the most costly disease of the livestock (Sharif *et al*., 2008).

When compared to clinical form of mastitis, sub-clinical mastitis is 15 to 40 times more prevalent, difficult to detect, and constitutes a reservoir of microorganisms that can affect other animals within the same herd due to its contagious nature of the organism (Schultz *et al*., 1978). According to Jasper *et al.* (1982), Subclinical mastitis is three to four times more common than the clinical mastitis. Husbandry, nutrition, management and genetics influence the prevalence of subclinical mastitis (Elbers *et al*., 1998). In buffaloes, sub-clinical mastitis is one of the most important reasons for culling and termination of lactation (McDowell *et al*., 1995). Even though mastitis is contagious, buffaloes are naturally less susceptible to mastitis than cattle (Thapa and Kaphle, 2002).

Detection of sub-clinical mastitis helps improving the milk production in terms of both quality and quantity and there by the economic status of the buffalo farmer. Somatic Cell Count (SCC) is the real index of Intra Mammary Infection or IMI (Sharif *et al*., 2009). SCC in milk increases during IMI (Harmon, 1994). Macrophages constitutes majority of the somatic cells and there are neutrophils, epithelial cells and mononuclear cells (Sandholm, 1995).

California mastitis test (CMT), an indirect method, is used to measure somatic cells in the milk sample (Sharma *et al*., 2010). CMT is quick, cheap, and simple, according to Michael McFadden, 2011 and Sharma *et al*., 2010 and gives instant results by the determination of potential infection status in dairy animals. CMT and SCC are useful in diagnosing sub-clinical mastitis even in a large herd.

The objective of this study was to investigate the normal somatic cell count (SCC), associated factors in hygienic management and to define subclinical mastitis in buffaloes in Puducherry region.

MATERIALS AND METHODS

This present study was conducted at different farms in and around Puducherry. Fifty clinically healthy lactating buffaloes stationed in the farms were selected. Data was collected from the farmers regarding housing, management practices, knowledge on clean milking practices and diseases. Management practices include vaccination and deworming schedules, milking time and type of milking being done, hygienic practices followed in the farm etc.

Milk samples were collected by following clean milking practices as described by Barbuddhe *et al*. (2008). Samples from each quarter were collected into clean test tubes for analysis. The milk was subjected to pH testing, CMT, and SCC. pH was tested for all the samples individually and also for the pooled milk sample. CMT was conducted for milk samples collected from individual animals and individual quarters. Somatic cell count was later conducted to all the milk samples. SCC was done by Newman-Lampert staining technique. The upper limit of SCC was determined $\geq$ 2, 00,000/ml of milk based on the mean $\pm$ 2SD of a total SCC.

RESULTS AND DISCUSSION

Regarding the hygiene, all the farms had poor management and improper housing. All the farmers were rearing buffaloes on soil flooring and mostly without any housing or pakka housing.

Proper education on hygienic management is need of the hour for buffalo owners of Puducherry region.

75% owners claim that they vaccinate the animals regularly for Foot and Mouth Disease and Hemorrhagic septicemia and all the owners were regular in deworming the buffaloes. Regarding to the type of milking, 36% owners said that they follow full-hand milking, 16% following stripping, 10% knuckling, and 38% are following both stripping and knuckling.

In the present study 88% of them said that they have knowledge on clean milking practices. During milking, all the milkers wash their hands and udder and 88% were cleaning utensils thoroughly. But only 14% were cleaning the surroundings and 60% were discarding first few drops of milk to reduce contamination. None of them were wearing head caps during milking. All the owners are aware of Mastitis disease and complications.

pH was neural for all the samples. Nearly 96% of California mastitis test (CMT) of the milk samples were negative. Only 2 animals were positive for CMT out of 50 animals. The somatic cell count was <50,000 for 17 animals, 50,000 to 1,00,000 for 14 animals, 1,00,000 to >2,00,000 for 16 animals and 2,00,000/ml for 3 animals i.e, one buffalo, even with CMT negative showed SCC higher than 2,00,000/ml.

Subclinical mastitis was diagnosed on the basis of samples with SCCs ≥ 2, 00,000/ml and was found only in three buffaloes in the present study. The SCC of CMT positive quarter was significantly higher ($P<0.01$) than CMT negative quarters. Somatic cell counts were significantly higher in mastitis milk than normal milk. California mastitis test (CMT) and Somatic cell count were useful to diagnose sub - clinical mastitis easily and quickly. Multiple screenings are suggested since the accuracy of CMT is not 100% (Michael McFadden, 2011).

Table 1. Somatic cell counts in buffalo milk in the present study.

Sl. No.	Number of animals	Somatic cell counts per ml of milk
1	17	<50,000
2	14	50,000 to 1,00,000
3	16	1,00,000 to 2,00,000
4	3	>2,00,000

Figure 1. Buffalo farm in puducherry with flooring made of soil.

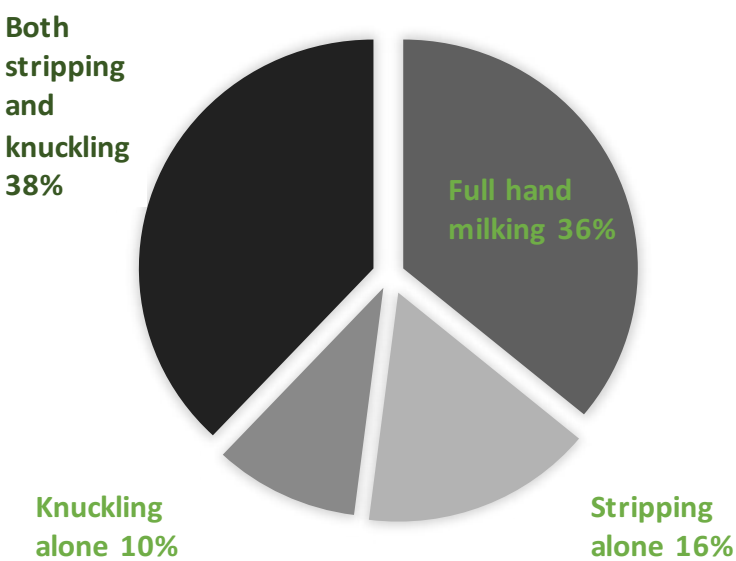

Figure 2. Type of milking being followed by the farmers.

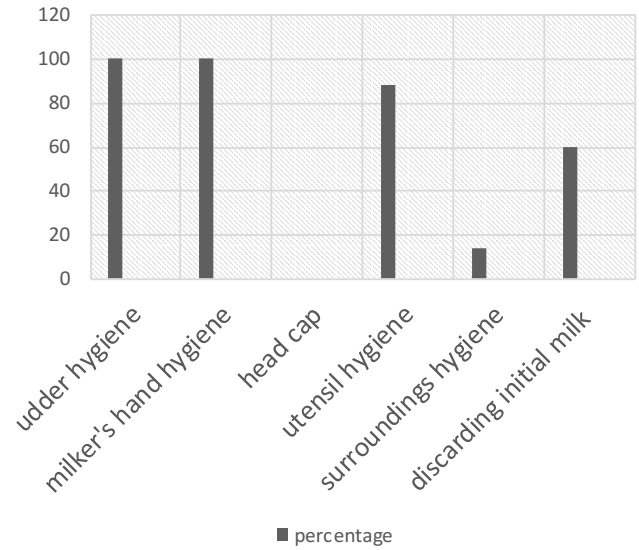

Figure 3. Clean milking practices followed by the farmers.

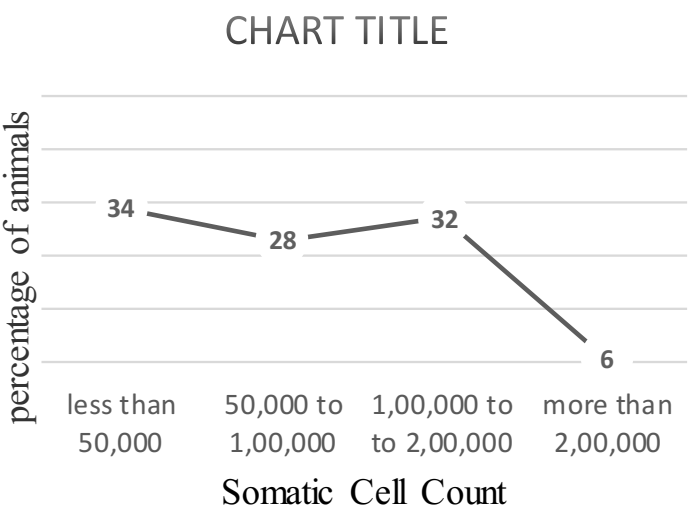

Figure 4. Somatic cell count in various animals.

REFERENCES

Aamir, S., M. Ghulam and A.S. Muhammad. 2009. Mastitis in Buffaloes, *Pak. J. Zool*., **9**: 479-490.

Barbuddhe, S.B. and B.K. Swain. 2008. *Hygienic Production of Milk, Technical Bulletin No. 11*. Research Complex for Goa, Indian Council of Agricultural Research, India. p. 403-402.

Elbers, A.R., J.D. Miltenburg, D. De Lange, A.P. Crauwels, H.W. Barkema and Y.H. Schukken. 1998. Risk factors for clinical mastitis in a random sample of dairy herds from the southern part of the Netherlands. *J. Dairy Sci*., **81**: 420-426

Harmon, R.J. 1994. Physiology of mastitis and factors affecting somatic cell counts. *J. Dairy Sci*., **77**: 2103-2112.

Jasper, D.E., J.S. McDonald, R.D. Mochrie, W.N. Philpot, R.J. Farmworth and S.B. Spencer. 1982. Bovine mastitis research needs funding and sources of support. p. 182-193. *In the Proceedings of 21st Annual Meeting, National Mastitis Council Inc., Louisville*, Kentucky, USA.

Korhonen, H. and L. Kaartinen. 1995. Changes in the composition of milk induced by mastitis. p. 76-82. *In* Jyvaskyla, G. (ed.) *The Bovine Udder and Mastitis*, Finland.

McDowell, R.E., J.C. Wilk, S.K. Shah, D.S. Balain and G.H. Metry. 1995. *Potential for Commercial Dairying with Buffalo*, North Carolina State University, USA.

Mehwish, M. Shahid and A. Iqra. 2015. Latest therapies to fight against MRSA infections in dairy animals. *International Research Journal of Multidisciplinary Studies*, **1**(3).

Michael, M. 2011. California mastitis test and milk quality. *Michigan Dairy Review*, **16**(2).

Patil, M.P., A.S. Nagvekar, S.D. Ingole, S.V. Bharucha and V.T. Palve. 2015. Somatic cell count and alkaline phosphatase activity in milk for evaluation of mastitis in buffalo. *Vet. World*, **8**(3): 363-366.

Radostits, O.M., C.C. Gay, K.W. Hinchcliff and P.D. Constable. 2007. *Veterinary Medicine: A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats, and Horses*, 10th ed. Elsevier Saunders. New York, USA. p. 673.

Sandholm, M. 1995. Detection of inflammatory changes in the milk, p. 98-104. *In* Jyvaskyla, G. (ed.) *The Bovine Udder and Mastitis*, Finland.

Schultz, L.H., R.W. Broom, D.E. Jasper, R.W.M. Berger, R.P. Natwke, W.N. Philpot, J.W. Smith and P.D. Thompson. 1978. *Current Concepts of Bovine Mastitis*, 2nd ed. National Mastitis Council, Washington DC, USA. p. 6-9.

Sharif, A. and G. Muhammad. 2008. Somatic cell count as an indicator of udder health status under modern dairy production: A review. *Pak. Vet. J*., **28**(4): 194-200.

Sharma, N., V. Pandey and N.A. Sudhan. 2010. Comparison of some screening tests for detection of subclinical mastitis in dairy cows. *Bulgarian Journal of Veterinary Medicine*, **13**: 98-103.

Thapa, B.B. and K. Kaphle. 2002. Selecting different drug combinations for the control of bovine clinical mastitis. *J. Anim. Vet. Adv*., **1**: 18-21.