



Prevalence of bovine subclinical mastitis in Odisha

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ABSTRACT

A total of 2166 quarters of 1736 crossbred Jersey lactating cows having a minimum yielding record of eight liters of milk per day at different calvings and stages of lactations in four milk-shed districts of Odisha i.e., Jagatsinghpur, Khordha, Cuttack and Puri were randomly screened during May 2014-June 2015 for presence of mastitis in general and subclinical mastitis (SCM) in particular. Modified California Mastitis Test (MCMT) followed by microbiological examination of milk sample was undertaken for confirmatory diagnosis of SCM. The overall prevalence rate of SCM in Odisha was 39.17 %. Presence of subclinical mastitis dominated over clinical mastitis in all the districts with a prevalence rate of 33.53% (582/1736) and 5.65% (98/1736), respectively. Prevalence of SCM in four districts of Odisha varied between 30.33 % (Puri) to 37.59 % (Jagatsinghpur). Presence of SCM was highest in the left hind quarter (30.71%) and least in the right fore quarter (19.35%). Cows in early stage of lactation (First 3 months of lactation) were more (50.69%) susceptible to SCM than the cows in mid (4 to 6 months of lactation) and late (7 to 9 months of lactation) lactation (31.10, 18.21%). Prevalence to SCM increased with advancement of lactation i.e., highest in 4th lactation or above (37.97%) and lowest in 1st lactation (10.14%).

Key words: Subclinical mastitis, bovine, prevalence, lactation

INTRODUCTION

Mastitis continues to be a world-wide problem and results in enormous economic loss due to reduced milk production, therapeutic expenses, discard of milk during the treatment period, changes in milk quality, deterioration in quality, risk of mortality and early culling of superior cows (Bhanderi *et al.* 2013). As a whole, the loss is more in subclinical mastitis when compared to its clinical form. In addition, milk from mastitis affected cows may harbor the organisms potentially pathogenic to humans (Sharma *et al.* 2006). Survey conducted in the major milk-producing countries indicates that

mastitis afflicts 15 to 50% of cows each year (Radostits *et al.* 2007). Here is an attempt to reveal the prevalence status of bovine subclinical mastitis (SCM) in major milk producing districts of Odisha.

MATERIALS AND METHODS

A study was conducted during May 2014-June 2015 in four districts of Odisha i.e., Cuttack, Jagatsinghpur, Puri and Khordha with record of high milk production. Four villages from each of the selected district were enlisted and cross-bred Jersey cows having a minimum yielding record of eight liters milk per day were randomly screened for detection of SCM. As per the length of lactation,

selected cows were grouped under early lactation (First 3 months of lactation), mid (4 to 6 months of lactation) and late lactation (7 to 9 months of lactation). Further, on the basis of number of calving(s), cows were classified as 1st calver, 2nd, 3rd, 4th calver and above. Apparently healthy cows without any visible abnormality in the milk and/or gland, but history of gradual loss of milk yield, were subjected to the cow-side test i.e. Modified California Mastitis Test (MCMT) followed by microbiological examination of milk sample for confirmatory diagnosis of SCM.

RESULTS AND DISCUSSION

Prevalence of bovine subclinical mastitis in different high milk producing districts of Odisha with respect to position of quarter, stage of lactation and no. of calving have been depicted in the table 1. A total of 1736 crossbred Jersey population were screened in four milk producing districts of Odisha, of which 680 (39.17 %) cows were found positive to mastitis comprising of both subclinical and clinical mastitis in 582 (33.53%) and 98(5.65%) heads, respectively. The district-wise prevalence of SCM in Jagatsinghpur, Khordha, Cuttack and Puri were 37.59 %, 30.33, 33.19 and 32.67 %, respectively. Bhandari and Garg, (2012) reported 30 - 40 times higher prevalence of subclinical mastitis than clinical mastitis. Prevalence rate of SCM ranging between 14.8 - 36.67% has been recorded by earlier investigators (Delelesse, 2010 and Moges *et al.*, 2011). Prevalence as high as 62.9 - 95.0 % has been reported by Byarugaba *et al.*, (2008) and Kurjogi and Kaliwal (2011). It is proper to mention here that environmental factors play a significant role in the prevalence of sub-clinical mastitis (Radostits *et al.* 2007).

Maximum number of cows were under the grip of SCM in Jagatsinghpur district (41.74%) followed by Cuttack (39.41%), Puri (35.05%) and Khordha (34.95%). In other, way of analysis, the prevalence of SCM was highest in the left hind quarter (30.71%) and least in the right fore quarter (19.35%). The results clearly indicated higher prevalence of SCM in the hind quarters than fore quarters which corroborated with the findings of

Khan and Muhammad (2005) and Awale *et al.*, (2012). This observation could also be correlated with the higher chance of exposure to hind quarters by dung and urine (Guha *et al.* 2012). It is a fact that more milk yield is synthesized in hind quarters making them more vulnerable to wear and tear so also higher chance of inflammatory reaction (Ramprabhu and Rajeswar, 2007; Sharma *et al.* 2007).

Highest and lowest degree of prevalence was recorded in 4th calvers or above (37.97%) and 1st lactation (10.14%), respectively. It could be inferred that susceptibility to SCM increases with advancement of calving number. Results were of similar pattern in all the four districts included in the study. These findings are supported by Rabbani and Samad (2010) who reported a higher prevalence of SCM in the 4th lactation and observed an increasing trend with increase in parity. Zahid (2004) observed highest incidence of SCM between 6th and 7th lactation. The possible cause for high rate of mastitis with increase in the number of lactation may be due to higher milk yield during this period showing a direct correlation between milk yield and the prevalence of mastitis. The increased prevalence of SCM with progression of lactation could be due to the relaxation of sphincter muscle and stratified squamous keratinized epithelium of teat canal which eventually accelerate the chance of exposure to pathogen causing SCM.

Prevalence of SCM was highest in early lactation (50.69%), followed by mid (31.10%) and late lactation (18.21%) and such trend was also recorded in all four districts. Earlier results reported by Radostits *et al.* (2007), Corbett (2009), Sharma *et al.* (2011), and Zeryehun *et al.* (2013) corroborated present findings. The higher occurrence of SCM during early lactation might be due to oxidative stress and strain associated with onset of production phase at post-calving period when the immune status is considered to be weak. There is decreased neutrophil function, delayed neutrophil migration to the mammary gland and faster growth of bacteria in the mammary gland in early lactation (Shuster *et al.* 1996). Absence of dry cow therapy regime could possibly be the major

factor contributing to high prevalence at early lactation and early infection associated with delayed diapedesis of neutrophils into the mammary gland (Schalm *et al.* 1971). The higher incidence of mastitis during early stage of lactation may be attributed to either intra-mammary infections that do not resolve or new intra-mammary infections developed during the dry period flaring up during early lactation due to sudden change in the udder environment and high milk production (Dingwell *et al.* 2003).

The study revealed that one or more factors contributing onset SCM in high yielder i.e., nutritional deficiency, high environmental temperature, poor hygienic condition, lack of dry cow therapy and insufficient exercise as well as exposure to sunlight exist. The difference in prevalence of subclinical mastitis could be attributed to the difference in breeds of animals, immune status and management practices.

CONCLUSION

Screening of 1736 crossbred Jersey cows surfaced presence of subclinical and clinical mastitis in 582 (33.53%) and 98(5.65%) heads indicating an overall prevalence rate of 39.17 %. Prevalence of subclinical mastitis in four districts of Odisha i.e., Jagatsinghpur, Khordha, Cuttack

and Puri varied between 30.33 to 37.59 % with a higher rate of infection in hind quarters and early lactation. Cows in 4th lactation or above are more susceptible to mastitis than cows with less number of calving.

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Table 1. Prevalence of bovine subclinical mastitis in different districts of Odisha with respect to position of quarter, stage of lactation and number of calving

Districts	No. of cows examined	No. of quarters examined	No. of cows/quarter with subclinical mastitis										
			Quarter in position				No. of calving				Stages of lactations		
			Left fore	Left hind	Right fore	Right hind	1 st	2 nd	3 rd	4 th or above	Early	Mid	Late
Jagatsinghpur	439	642	53 (19.78)	81 (30.22)	55 (20.52)	79 (29.48)	17 (10.30)	28 (16.97)	54 (32.73)	66 (40.00)	82 (49.70)	55 (33.33)	28 (16.97)
Puri	389	408	27 (18.88)	49 (34.27)	23 (16.08)	44 (30.77)	15 (12.71)	25 (21.19)	33 (27.97)	45 (38.14)	68 (57.63)	37 (31.36)	13 (11.02)
Cuttack	458	581	48 (20.96)	70 (30.57)	45 (19.65)	66 (28.82)	18 (11.84)	36 (23.68)	41 (26.97)	57 (37.50)	74 (48.68)	42 (27.63)	36 (23.68)
Khordha	450	535	39 (20.86)	54 (28.88)	37 (19.79)	57 (30.48)	9 (6.12)	38 (25.85)	47 (31.97)	53 (36.05)	71 (48.30)	47 (31.97)	29 (19.73)
Total	1736	2166	167 (20.19)	254 (30.71)	160 (19.35)	246 (29.75)	59 (10.14)	127 (21.82)	175 (30.07)	221 (37.97)	295 (50.69)	181 (31.10)	106 (18.21)

NB: Figures in parentheses indicate percentage

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