

OCCURRENCE OF SUBCLINICAL MASTITIS IN CATTLE IN AND AROUND JABALPUR, MADHYA PRADESH

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ABSTRACT

Lactating cows (n=550) were screened by Modified California Mastitis Test (MCMT) for subclinical mastitis (SCM) during the period from February, 2015 to February, 2016. The overall occurrence of SCM, animal-wise and quarter-wise was 27.81% (153/550) and 10.13% (212/2092), respectively. Highest occurrence of SCM was observed in right hind quarter (13.35%) followed by left hind quarter (9.88%), right fore quarter (9.09%) and left fore quarter (8.15%). Age-wise occurrence was found to be the highest in cows of 5-7 years of age (36.36%). The highest occurrence of SCM was observed in 3rd parity (41.83%), in early lactation stage (47.46%) and in cross bred (36.43%) animals. Occurrence in organized and unorganized dairy farms did not differ significantly.

Key words: Mastitis, modified California mastitis test, dairy animals

Mastitis is a common disease entity of dairy cows, accompanied by physical, chemical, pathological and bacteriological changes in milk and glandular tissue. The disease is usually classified as subclinical, acute, subacute and chronic based on aetio-pathological findings and observations (Mir *et al.*, 2014). Mastitis remains a serious problem for dairy industry and has very serious ramifications worldwide. The subclinical form of mastitis (SCM) in dairy cows is important because this form is 15 to 40 times more prevalent than the clinical form (Kader *et al.*, 2002), usually precedes the clinical form, of long duration and difficult to detect. Several causative agents including bacterial, mycoplasmal and yeast pathogens (Ergun *et al.*, 2004) have been implicated in mastitis in dairy cows. Predisposing factors such as poor management and hygiene, teat injuries and faulty milking machines are known to hasten the entry of infectious agents and the course of the disease. The present study was undertaken with the aim to detect the occurrence and risk factors of SCM in lactating cattle in and around Jabalpur.

MATERIALS AND METHODS

Animals: A total of 550 lactating cattle belonging to non-descript, cross bred and exotic breeds were screened during the period from February 2015 to February 2016 by Modified California Mastitis Test (MCMT). The cattle belonged to the dairy farms in and around Jabalpur viz. Livestock Farm, Adhartal, N.D.V.S.U., Dayodaya gaushala, Central Jail gaushala and Rani Avantibai gaushala, Gadarkheda, Barella, nearby villages of Jabalpur

like Nuniakala (Panagar) and Noni (Shahpura) and different private dairy farms of Jabalpur, Madhya Pradesh (M.P.). Different parameters i.e. breed, age, lactation number, stage of lactation, herd size and number of quarters affected were recorded.

Clinical Examination of the Udder/Milk: The udder was subjected to clinical examination by manual palpation of each individual teat and was clinically observed for atrophy, consistency or variation in the size of teat and teat position. The glands were palpated for indurations and asymmetry. Teat ends were observed for alterations such as scars, wounds, patent teat orifice and ease of milking. The udder was examined to ascertain the abnormality (unilateral or bilateral). Milk was examined for quantity which includes reduction in milk and watery consistency of milk and also for the quality i.e. discoloration, clots or flakes, pus and blood staining.

Statistical Analysis: The data was analyzed by Chi square test (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Occurrence of SCM: Overall occurrence of SCM animal-wise was 27.81% (Table 1) which is very close to the findings of Islam *et al.* (2011). However, the higher occurrence of SCM compared to the present study was reported by Dar *et al.* (2014) and Mir *et al.* (2014) who had recorded 65% and 57.80% prevalence of SCM, respectively. This variation in the occurrence of SCM in cattle might be attributed to the selection of animals, season, breed and management practices. The factors like herd size, agroclimatic conditions of the region, variations in socio-cultural practices, milk marketing,

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Table 1
Occurrence of subclinical mastitis at cow and quarter' levels in dairy farms

Particulars	Number positive /Number Screened	Occurrence (%)
Total No. of animals	153/550	27.81
Total no. of quarters	212/2092 (108 blind teats)	10.13

literacy level of the animal owner and system of feeding were found affecting the occurrence of SCM (Ergun *et al.*, 2004). Quarter-wise overall occurrence of SCM was found to be 10.13% (Table 1). Contrary to our observations, Hashemi *et al.* (2011) and Mir *et al.* (2014) recorded 21.60% and 30.73% occurrence of SCM quarter wise, respectively. The reason of low occurrence in this study was probably due to large number of quarters (2098) screened. However, the findings of this study were in close conformity to the findings of Almaw *et al.* (2008).

Individual Quarter Afflicted with SCM in Cattle: In the present study, hind quarters (11.60%) were found to be more susceptible to SCM when compared to fore quarters (8.62%, Table 2), which are in agreement with the report of Awale *et al.* (2012) (Table 2). The high chance of getting faecal and environmental contamination and high production capacity of the hind quarters (Radostits *et al.*, 2010) could be the probable reasons. The right side quarters were found to be more susceptible (11.23%) to SCM than the left side quarters (9.03%). These observations are in conformity with those of Qadri (2015) who have reported the occurrence as 32.25% and 27.25% in the right and left side quarters, respectively. Because the animals adopt right side sitting posture which causes widening of teat canal due to pressure exerted to right side quarters hence, it provides exposure to entrance of organism. Further, the study revealed right hind quarter (13.35%) to be more susceptible than the left hind quarter (9.88%, Table 2). The higher occurrence of right hind quarter could be further justified as common practice adopted by the milkers during milking the animals. There may be probability of infection because of the handling of right hind quarter at first by the milkman while milking the animal.

Table 2
Individual quarter afflicted with subclinical mastitis in cattle

Quarter's position	Number positive /Number screened	Occurrence (%)
Right	Fore	47/517
	Hind	70/524
	Total	117/1041
Left	Fore	42/515
	Hind	53/536
	Total	95/1051

$\chi^2=7.1211$; $df=03$; $P=0.06813$

Table 3
Breed-wise occurrence of subclinical mastitis in cows

Breed type	Number positive /Number screened	Occurrence (%)
ND	32/145	22.06
H.F.	27/147	18.36
Cross bred	94/258	36.43

$\chi^2=10.4452$; $df=02$; $P=0.005392$

Breed-wise Occurrence: Analysis of data of occurrence with respect to breed showed significant variation ($P<0.05$) among various breeds of cattle (Table 3). The occurrence of SCM was the highest in cross bred cattle followed by non-descript cattle and lowest in H.F. Islam *et al.* (2011) and Dar *et al.* (2014) detected higher prevalence of SCM in milch crossbred cows. The significant difference between the breeds may be associated with their milk yield. Radostits *et al.* (2010) stated that high yielding cattle are more susceptible to mastitis than low yielding ones might be because of more resistance to disease.

Age-wise Occurrence: Age-wise occurrence of SCM revealed a significant variation ($P<0.01$) among various age groups. Highest occurrence (36.36%; 104/286) was observed in the cattle of 5-7 years of age group followed by 19.64% (22/112) occurrence in cattle of 7 years and above age group and the lowest occurrence of 17.76% (27/152) in cattle of 3 to 4 years of age group. During 5-7 years of age the animals were approximately in 3rd to 5th lactation, had a highest milk yield, thus remained under stress and more prone to infection. Tiwari *et al.* (2013) reported that occurrence of mastitis in infected quarters increases with age in cows being the highest at 7 years of age. This might be due to increase cellular response to intra-mammary infection. Efficient innate host defense mechanism of the younger animals are one possibility that makes them less susceptible to infection, while in older animals there is reduction in milk yield, less milking practice, meager handling of the animals etc. may reduce the chance of infection.

Parity-wise Occurrence of SCM: Parity-wise occurrence of SCM exhibited significant variation ($P<0.01$) among various groups and it was highest in 3rd parity (41.83%) in cattle (Table 4). Similar observations were recorded by Islam *et al.* (2011). During 3rd parity there is high yielding stress on udder causes the broadening of teat canal due to the pressure on teat sphincter resulting in increased chance of microbes entry and hence increased the chance of infection. The occurrence of SCM according to lactation stage was observed highest in early lactation stage (47.46%) (Table 5). Islam

Table 4
Parity-wise occurrence of SCM in cattle

Parity	Number positive /Number screened	Occurrence (%)
1st	11/64	17.18
2nd	16/88	18.18
3rd	41/98	41.83
4th	38/110	34.54
5th	25/78	32.05
6th	11/48	22.91
7th and more	11/64	17.18

$\chi^2=13.852$; $df=06$; $P=0.0089$

Table 5
Lactation stage wise occurrence of subclinical mastitis in cattle

Lactation stage	Number positive /Number Screened	Occurrence (%)
Early (1-3 months)	75/158	47.46
Mid (3-6 months)	54/224	24.10
Late (>6 months)	24/168	14.28

$\chi^2=25.4423$; $df=02$; $P=0.00001$

et al. (2011) also reported highest prevalence of SCM during the early lactation stage. High incidence of udder infection and mastitis in early lactation might be due to the rapid physiological changes which take place in the mammary tissues post partum, resulting in reduced udder resistance. Increased incidence of mastitis during early or peak lactation may be a result of negative energy balance (Suriyasathaporn *et al.*, 2000). Significant variation was observed with respect to different lactation stage.

Clinical Examination of Udder/milk: During the present investigation the cattle afflicted with SCM did not exhibited any clinical signs except reduced milk yield. Similar observations were recorded by Radostits *et al.* (2010) who have reported that no clinical signs associated with SCM as well as no physical abnormalities were found in the milk. In the present study the colour, consistency and odour of milk were found to be normal, however, reduction in milk yield was recorded in SCM. The present observations were correlated by the findings of Suresh *et al.* (2010).

Overall occurrence of SCM animal-wise and quarter-wise was 27.81% and 10.13%, respectively. Occurrence of SCM was found to be the highest in cows of 5-7 years of age, in right hind quarter, between third parity and early lactation stage.

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