

# Epidemiological Studies on Subclinical Mastitis in Dairy Cows of Rewa District of Madhya Pradesh

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## Abstract

*Epidemiological studies on subclinical mastitis (SCM) in the lactating cows were performed with four different diagnostic tests like modified California Mastitis Test (mCMT), somatic cell count (SCC), electrical resistance (ER) and milk pH. Apparently healthy cows had the mean value of SCC, ER and milk pH was  $1.49 \pm 0.11 \times 10^5$  cells/ml,  $363.33 \pm 15.20$  unit and  $6.62 \pm 0.06$ , respectively, while these values got significantly changed to  $19.78 \pm 4.99 \times 10^5$  cells/ml,  $311.67 \pm 17.40$  unit and  $7.55 \pm 0.04$ , respectively in SCM infected cows. Different risk factors for SCM like age, parity, season and breed were taken into account in the present study. The results showed that the prevalence of SCM on the basis of mCMT grading was + (56.58%), ++ (34.21%) and +++ (09.21%). The highest prevalence was observed in cows of age group between 3-5 years (53.70%) followed by age group of 5-8 year (28.13%), while lowest in age group of 8 years and above (18.33%). The breed wise prevalence of SCM was found to be highest in exotic breed (42.47%), followed by crossbreed (32.14%), and descriptive breed (25.49%) and lowest in non-descript cows (22.58%). Season also affected the prevalence of SCM, the highest was observed in monsoon or rainy season (43.48%), followed by winter season (31.67%) and lowest in summer season (23.68%). Results of the present study suggested that lactating cows should be screened at regular interval for mastitis to curtail economic losses to dairy farmers.*

**Keywords:** Age, California Mastitis Test, Parity, Season and Breed, Subclinical Mastitis

## Introduction

Mastitis is one of the most important diseases of dairy cows in India and worldwide (Joshi and Gokhale, 2006; Sinha *et al.*, 20011). Subclinical mastitis (SCM) is approximately 15 to 40 times more prevalent than clinical mastitis (Seegers *et al.*, 2003). But, SCM often goes undetected and given less importance than CM. Infected cows become source of infection to other lactating cows (Ruegg, 2017). Clinical mastitis is characterized by visible inflammatory signs in udder and teat and physical and chemical changes in milk. However, physical signs of inflammation in udder and teat and physical changes in milk is absent in SCM, though it is the most common form of mastitis (Orlandini and Bijgaart, 2011). Prevalence of SCM varies from herd to herd and place to place (Hussain *et al.*, 2013). It causes reduced milk production, poor quality of milk and thereby huge economic loss to dairy sector (Radostits *et al.*, 2007; Kumari *et al.*, 2020). Besides economic effects, mastitis is also responsible for public health hazards. Milk contaminated from affected dairy cattle with bacteria may render it inappropriate for human consumption (Karimuribo *et al.*, 2005; Sharma *et al.*, 2006; Hameed *et al.*, 2007).

Information on SCM in local, descriptive, non-descriptive and crossbred cows in Madhya Pradesh is scanty. Especially, no study has been taken up to find out SCM in Rewa District of Madhya Pradesh (India). Therefore, the present study was conducted to determine the prevalence and to quantify the occurrence of SCM and associated risk factors. The information obtained would be helpful in planning mastitis control strategies in the study area.

## Materials and Methods

### Study Area

The present study was conducted in urban, peri-urban and rural areas of Rewa district of Madhya Pradesh (India), which is located between 24° 18' and 25° 12' north latitudes and 81° 2' and 82° 18'. It has a humid subtropical climate, with cold, misty winters, hot summer and a humid monsoon season. This area has been naturally bestowed with immensely rich domestic livestock diversity.

### Epidemiological Studies

Epidemiology of SCM in cattle were studied in lactating dairy cows with different risk factors. The standard questionnaire was prepared to collect the information from the organized/ unorganized farms/village incorporating different parameters, about individual animals, age, lactation number (parity), seasons and breed of cattle. The milk samples were collected from 944 quarters of 242 cows during June 2018 to July 2019.

### Clinical Examination of the Udder and Milk

The dairy farms were physically inspected for cleanness, the udder and every individual teat was examined clinically. Each of the teat ends were examined manually for alterations such as wounds, scars, patent teat orifice and ease of milking. The udder was also examined to ascertain the abnormality in the form of inflammatory swelling, fibrosis etc. Milk of cattle was examined for clots or flakes, pus, discoloration, consistency and blood staining (Quinn *et al.*, 2002).

### Detection of Mastitis

Modified California Mastitis Test (mCMT) was used for screening of lactating dairy cattle as cow side test on the spot to confirm the positive SCM milk samples. The interpretation of severity of SCM, different scoring system for mCMT was considered. Based on the thickness of the gel formed by mCMT reagent-milk mixture, test results were scored as 0 (negative), + trace ++ (weak positive), +++ (distinct positive), and ++++ (strong positive). Positive CMT-cows were defined as having at least one CMT-positive quarter (David *et al.*, 2005; Sharma *et al.*, 2018).

### Collection of Milk Samples

The milk sample was collected from each teat of cow indicating mCMT positive for SCM. The udder and teats were cleaned and washed with 0.01% KMnO<sub>4</sub> solution then wiped with clean cloth. First few streams of foremilk was discarded and milk from each affected quarter was collected in sterile, labeled screw capped test tubes and brought



29.09% and 12.73% prevalence, while 57.55%, 31.60% and 10.85% prevalence also reported by Maheshwari *et al.* (2016) on the basis of mCMT grading in cattle affected with SCM. Gokhale (2006) mentioned that CMT was the most sensitive (95.16%) and specific (98.02%) test for the detection of SCM. Dar *et al.* (2014) stated that the CMT was an indirect estimation of somatic cell count.

**Table 2:** mCMT grading wise prevalence of SCM in dairy cows

mCMT score	No. of mCMT positive quarters for SCM (n=76)	Prevalence (%)
+ (Trace)	43	56.58
++ (Weak)	26	34.21
+++ (Distinct Positive)	7	9.21
++++ (Strong Positive)	0	0

### Age Wise Prevalence of SCM

The age wise prevalence of SCM was highest in cow of age group between 3-5 years (53.70%) followed by those in the age group of 5-8 year (28.13%), while lowest (18.33%) was observed in age group of 8 years and above (Table 3). In the present study, adult age group of cows were more susceptible for SCM which may be due to increased milk production, nutrition stress and less immunity. These findings are in accordance with the results of Dasohari *et al.* (2017) and Sheikh *et al.* (2018). Mourya *et al.* (2020) reported highest (38.50%) prevalence of SCM in age of 5-7 years followed by 33.03% in age of 7 years and above and lowest (18.97%) in age of 3 to 4 years. Maheshwari *et al.* (2016) and Shaikh *et al.* (2019) showed that 5-7 years age group of cows were more susceptible to SCM as compared to other age groups. Siddiquee *et al.* (2013) reported the higher prevalence (84.40%) of SCM in more than 7 years old cows and stated that prevalence of SCM significantly increased with the advancement of the age.

**Table 3:** Age wise prevalence of SCM in dairy cows

Age group	No. of cow screened	No. of cow positive	Prevalence (%)
3-5 year	54	29	53.7
5-8 year	128	36	28.13
8 year and above	60	11	18.33

### Breed Wise Prevalence of SCM

The breed wise prevalence of SCM in various breed of cattle was observed to be 42.47% in exotic breed, followed by 32.14% in crossbreed, 25.49% in descriptive breed and 22.58% in non-descript breed of cows (Table 4). The incidence of SCM was more in the exotic and crossbred cows compared to the native breeds. These findings are in close agreement with the results of Kayesh *et al.* (2014), Islam *et al.* (2011) and Abdel-Rady and Sayed (2009), who reported 45.28%, 36.36% and 20.43%, in crossbreds and 22.45%, 24.61% and 16.67% in native breeds, respectively. Mourya *et al.* (2020) reported a highest prevalence in cross bred cattle (35.06%), followed Malwi cattle (33.33%), Sahiwal (31.82%) and lowest in Gir (25.00%) and non-descript cattle (25.00%). The difference in prevalence of SCM between the breeds may be associated with their high milk yielding of the cattle, which makes them more prone to mastitis (Radostits *et al.*, 2010) as compared to native breed with higher resistance.

**Table 4:** Breed wise prevalence of SCM in dairy cows

Breed type	No. of cows screened	No. of cows positive	Prevalence (%)
Exotic Breed	73	31	42.47
Descriptive Breed	51	13	25.49
Cross Breed	56	18	32.14
Non-descriptive Breed	62	14	22.58

### Season Wise Prevalence of SCM

Season also affect the prevalence of SCM, the highest in rainy or monsoon season (43.48%), followed by winter season (31.67%) and lowest in summer season (23.68%) in cows (Table 5). The present and preceding studies

indicate that the risk of developing SCM in monsoon season is more as the conditions are favorable for the proliferation of pathogenic bacteria. The seasonal variation is an important factor that directly affects the occurrence of mastitis (Shathele, 2009). The present result are in close agreement with findings of Jadhav *et al.* (1995), Ameh *et al.* (1999) and Kurjogi and Kaliwal (2014). Cows with dirty udders are 1.5 times more likely to have major pathogens isolated from their milk samples than cows with clean udders (Schreiner and Ruegg, 2003).

**Table 5:** Season wise prevalence of SCM in dairy cows

Season wise	No. of cows screened	No. of cows positive	Prevalence (%)
Winter	120	38	31.67
Rainy/Monsoon	46	20	43.48
Summer	76	18	23.68

## Conclusion

The present study was carried out to observe the prevalence of SCM on the basis of mCMT, ER, SCC and milk pH. Prevalence of SCM on the basis of mCMT grading was + (56.58%), ++ (34.21%) and +++ (09.21%). The prevalence of SCM was highest in cows of age group between 3-5 years (53.70%), exotic breed (42.47%) and monsoon or rainy season (43.48%). Considering the results of the current investigation, it is concluded that SCM is directly associated with age, breed and season. The present study reflects that environmental factors play a major role in SCM. Therefore, it is recommended to screen the lactating cows at regular interval.

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## Conflict of Interests

There is no conflict of interest.

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