

## MORPHOLOGICAL STUDY ON TYPES OF UDDER AND TEATS IN ASSOCIATION WITH SUBCLINICAL MASTITIS IN GIR COWS

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**Abstract:** The present experiment was conducted to study the types of udder and teat morphology and their association with subclinical mastitis in Gir cows of Anand district. Animals were selected on random basis. Udder and teat type were observed prior to milking and milk samples were collected for laboratory test for estimation of somatic cell count. Higher incidence of mastitis in goaty and pendulous udder was found. Bottle shaped (33.33%) teats were more prone to mastitis followed by funnel (29.02%), cylindrical (25.00%) and pear shaped (24.66%). Highest incidence of somatic cell count was observed in pendulous udder and bottle teat combination (55.56%).

**Keywords:** Udder, teat, subclinical mastitis, Gir.

### INTRODUCTION

Dairying has become an important secondary source of income for millions of rural households engaged in agriculture. India has witnessed white revolution attributed to its manifold increase in milk production during post-independent era, which has increased from 17 million tons (1951) to 155.5 million tons (2015-16) and registered a growth of 6.27%. Per capita availability of milk in India has also increased (g/d) from 176 in 1990-91 to 337 in 2015-16 [1].

Physical characteristics of udder and teats are important traits associated with incidences of sub-clinical mastitis [3]. Teat canal is the first barrier against the invasion of mastitis pathogens into the udder and the integrity of the teat end tissue around the teat orifice is an important resistance factor to bacterial colonization of the quarter [14]. Subclinical mastitis results in decreased milk production by 10 to 20 per cent with undesirable effects on its constituents and nutritional value rendering it of low quality and thus unfit for processing [6]. Subclinical mastitis is characterized by having no visible sign either in the udder or in the milk, but the milk production decrease and the somatic cell count increases [5]. Financial loss

to the tune of 6053.21 crores per year in India due to mastitis among cattle and buffaloes has been reported [2]. Annual losses in the dairy industry due to mastitis was approximately 2 billion dollars in USA and 526 million dollars in India, in which subclinical mastitis are responsible for approximately 70% of these losses [17]. Therefore, the present experiment was conducted to study the types of udder and teat morphology and their association with subclinical mastitis in Gir cows.

## **MATERIALS AND METHODS**

Present study was conducted on 150 Gir cows, randomly selected from different locations of Anand district. The tests used to diagnose sub clinical mastitis were somatic cell count and changes in pH of the milk. Shape of udder and teat were determined through visual appraisal method and accordingly categorized into trough, round, goaty and pendulous shape of udder and cylindrical, funnel, bottle and pear shaped teats [10]. Plastic sampling bottles were thoroughly cleaned, washed, dried and sterilized in an autoclave for 15 minutes at 121 °C temperature and 15 psi pressure prior to collection of milk samples. Approximately 10 ml milk sample was collected aseptically from each quarter of cow during evening milking of all lactating Gir cows into 50 ml capacity centrifuge plastic sampling bottles after removing first two to three streams of milk from each teat. A total of 600 milk samples were collected during the experiment. Milk samples were packed in thermo coal box having ice packs and were brought to the laboratory. The samples were kept overnight under refrigeration temperature (4°C). Next day morning the samples were thawed at room temperature and laboratory test done for estimation of somatic cell count using Fossomatic™ Minor cell counter (A/S N. Foss Electric, Hillerod, Denmark) [4] at Department of Veterinary Medicine, Veterinary College, A.A.U., Anand. The samples having more than 5,00,000 SCC/ml of milk [8] and pH more than 6.8 [18] were considered as subclinical mastitis positive. Statistical analysis of data were done by using standard procedures viz. mean, frequency distribution, chi square test [15].

## **RESULTS AND DISCUSSION**

Prevalence of subclinical mastitis in cows with different shape of udder and teat are shown in Table 1 and 2. In present study, 82 (54.66%) cows and 167 quarters (27.83%) from 150 cows were found positive for sub clinical mastitis. Similar results were also found by others [12] but higher incidences (63.7%) of subclinical mastitis than the present findings were found in pure Jersey cows [13] where 43.48% quarters were positive for subclinical mastitis out of 184

quarters tested in crossbred cows. The lower incidences of somatic cell count (34.59 to 43.33%) have been reported by other workers [9 & 11].

Higher occurrence of subclinical mastitis were observed in goaty udder (63.15 %) followed by pendulous (55.55 %), round (51.51 %) and trough (47.05 %) shape udder. Lower incidences of subclinical mastitis in round shaped (34.18%) udders [3] and in trough shaped (35.24%) udder [7] contradicted the present findings. In present study, higher incidence of mastitis in goaty and pendulous udder was due to long and pendulous udder prone to injury and helps the pathogens to grow. The Holstein cows with pendulous udder had the highest risk of subclinical mastitis [16]. Thus, selection of cows against pendulous shaped udder could help in reducing the incidences of subclinical mastitis in Gir cows. In earlier studies, incidences of subclinical mastitis in goaty udders were found lower (31.6 % and 33.33 %) than that observed (63.15%) in present study [3 & 9].

The teat shape is also responsible for occurrence of sub clinical mastitis. Bottle shaped teats (33.33 %) are more prone to mastitis followed by funnel (29.02%), cylindrical (25.00%) and pear (24.66%). The high prevalence of sub-clinical mastitis in bottle (55.0%), cylindrical (34.66%) and funnel (34.4%) shaped teats as compared to present findings [3]. Similar trends with higher incidences of subclinical mastitis in cylindrical teats (41.59%) but lower incidence with conical/funnel (15.63 %) and bottle (13.18 %) shaped teats were observed by other worker [9]. 35.64% positive cases of subclinical mastitis in cylindrical teats followed by flat (35.37%), round (24.32%) and pointed (2.55%) teats were studied by others [7].

The highest incidences of subclinical mastitis were observed (Table 3) in pendulous udder and bottle teat combination (55.56%) followed by goaty udder and funnel teat (38.46%) combination. Pear shaped teats with pendulous shape udder showed zero incidence of subclinical mastitis. Round shape udder in combination with funnel and bottle shaped teats had less than 22% incidences of subclinical mastitis. Though, trough-cylindrical combination also had less than 20% reactors of subclinical mastitis but trough and round udder with combination of pear teat showed the highest incidences of subclinical mastitis. Thus, indirectly round/trough shape udder with combination either of any teat except pear teat become a choice to reduce incidences of subclinical mastitis and therefore may be considered among selection criteria for dairy cows.

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**Table 1. Incidences of subclinical mastitis in cows with different shape of udder**

Udder Shape	N	Incidences of SCM (n)	%
Trough	51	24	47.05
Round	33	17	51.51
Goaty	57	36	63.15
Pendulous	9	5	55.55
Overall	150	82	54.66

$X^2 = 2.98$ , df = 3, NS

**Table 2. Incidences of subclinical mastitis in Gir cows with different shape of teats**

Teat Shape	Total no. of quarters	Incidences (n)	%
Cylindrical	220	55	25.00
Funnel	193	56	29.02
Bottle	114	38	33.33
Pear	73	18	24.66
Overall	600	167	27.83

$X^2 = 3.09$ , df = 3, NS

**Table 3. Prevalence of SCM with different shape of udder and teat in Gir cows**

<b>Teat shape</b> <b>Udder shape</b>	<b>Cylindrical</b>	<b>Funnel</b>	<b>Bottle</b>	<b>Pear</b>	<b>Total</b>
Trough/Bowl	10 (65)	17 (62)	17 (51)	8 (25)	52 (203)
%	15.38	27.42	33.33	32.00	25.62
Round	19 (75)	2 (29)	2 (13)	4 (15)	27 (132)
%	25.33	6.90	15.38	26.67	20.45
Goaty	22 (63)	35 (91)	15 (42)	6 (33)	78 (229)
%	34.92	38.46	35.71	18.18	34.06
Pendulous	4 (16)	1 (10)	5 (9)	0 (1)	10 (36)
%	25.00	10.00	55.56	-	27.78
Total	55 (219)	55 (192)	39 (115)	18 (74)	167 (600)
%	25.11	28.65	33.91	25.35	27.83

Figures in the parenthesis indicate total number of teats and figure outside the parenthesis indicate subclinical mastitis positive case