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Epidemiological studies of subclinical mastitis in and around Parbhani in Goats

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Abstract
Mastitis is an infectious disease of the udder of dairy animals. Subclinical mastitis is disease of udder that passes mostly unnoticed. The presence of microorganisms associated with milk constitutes a major risk to consumers heath. The aim of this study was to determine the incidence of caprine subclinical mastitis. A total 120 lactating goats were randomly selected from different villages of Parbhani district of Maharashtra. Subclinical mastitis was detected by California mastitis test. The overall incidence of caprine subclinical mastitis in and around Parbhani was found to be 65%.The incidence of mastitis was correlated with age, lactation and quarter affected. The higher incidence of subclinical mastitis was found in 4 and above years of age group and the first, second and third lactation showed percent incidence of subclinical mastitis 35%, 55% and 81.6% respectively. The quarter infection rate of subclinical mastitis in goat was 49.58%. The results indicated higher incidence rate of subclinical mastitis in goats in and around Parbhani.

Keywords: Goats, sub-clinical mastitis, incidence, CMT, Parbhani

Introduction
Goats (*Capra hircus*) are one of the oldest domesticated species of animals and have been used for milk, meat, fur and skin across the world. Small ruminants such as goats offer many advantages compared to the larger livestock. The lower cost of the animals, the usability of the waste household resources by goats, the need for less feed and water and often not requiring specialized housing are some of the advantages. Therefore, it is reasonable that Mahatma Gandhi referred to goats as the "poor man's cow". Throughout the world dairy goat industry is rapidly growing and gaining the tremendous importance.

Due to the lower lactose content, goat milk can be consumed by people who are lactose intolerant or have allergies to milk of other species (Ahmed *et al.* 2020) [2]. Goat milk has therapeutic potential in case of liver dysfunction, jaundice, biliary disorders, acidosis and insomnia have also been reported (Miranda *et al.*, 2010). In addition to positive effects on the physical and sensory characteristics of dairy products, lipids of goat milk provide better digestibility with small fat globule size and high, short and medium-chain fatty acids content (Bhattarai, 2012) [4].

Mastitis is an inflammation of the mammary gland regardless of the cause and is characterized by a range of physical and chemical changes in the milk (Constable *et al.* 2017) [6]. Mastitis leads to an increase in milk somatic cell count as well as changes in the physical and chemical characteristics of milk (Dimitrov *et al.* 2018) [7]. Subclinical mastitis is one of the most important disease in small ruminants and considered as a constant risk of infection for the whole herd (Abdal Hamed *et al.* 2018) [1]. In subclinical mastitis, visible changes in udder tissue and gross abnormalities in milk secretion are not obvious. Subclinical mastitis denotes an absence of apparent abnormalities in the mammary gland but also the presence of chemical and bacteriological changes in milk (Chakrabarti, 1996) [5]. The Subclinical mastitis is the commonest in goats predominately caused by the contagious bacteria. (Shearer *et al.*, 2003) [19]. Epidemiological studies in cows were recently conducted by Shaikh *et al.* (2019) [18] and Shelke *et al.* (2019) [20] but not much studies about the sub clinical mastitis in goats.

Considering the above facts, the present study was therefore designed to investigate the incidence of subclinical mastitis in goats in surrounding of Parbhani district. It will be helpful to formulate the effective control and preventive strategies for subclinical mastitis in goats.

Material and Methods

Selection of animals

The lactating goats from various goat farms in and around Parbhani, veterinary polyclinics, veterinary dispensaries, goat unit and Veterinary Clinical Complex, College of Veterinary and Animal Sciences, MAFSU, Parbhani, were selected.

California mastitis test

Caprine subclinical mastitis was analyzed by the California mastitis test (CMT). The MCMT was performed according to the method described by Pandit and Mehta (1969) [15]. A plastic paddle having four chambers is used to perform the MCMT. After preparing the udder and discarding the foremilk the required quantity of milk approximately 2 ml from each quarter is taken into the CMT paddle. An equal quantity of milk was taken in each cup of the paddle. Then the approximately equal quantity of the above CMT reagent (test reagent) was added by the degree of precipitation or gel formation that occurs. Immediately after that, a mixture of milk and reagent was gently mixed by the circular movement of the paddle in a horizontal plane with minimum agitation. In negative cases, the mixture remains liquefied and without any change. Grading of the test positive samples was done according to the intensity of viscous and gel formation. The positive reaction was noted as trace, 1+, 2+, 3+ reactions depending on gel formation.

Incidence

The 120 lactating goats were screened with the help of a Modified California mastitis test for incidence study. The research work was carried out at the Department of Veterinary Clinical Medicine, Ethics & Jurisprudence, College of Veterinary and Animal Sciences, MAFSU, Parbhani. The incidence of mastitis was correlated with age, lactation and quarter affected.

Results and Discussion

The present study was carried out for a period of four months from Dec. 2020 - March 2021 in which 120 lactating goats were screened for subclinical mastitis with the help of MCMT. The milk samples were collected from goat presented to the Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Parbhani as well as Veterinary Polyclinics, goat unit agriculture collage, goat unit, COVAS, Parbhani and organized farms near Parbhani to study the incidence. In the present research work the overall incidence of subclinical mastitis in goats is depicted in Table 1.

Table 1: Incidence of Subclinical mastitis in goats in and around Parbhani district

Sr. No	Place	No. of animal examined	No. of animal +ve for SCM
1	Private Goat Farm (Tarwada)	60	43
2	Goat unit, Agriculture college, Parbhani	40	20
3	VCC, COVAS Parbhani	1.0	7
4	Goat unit, COVAS, Parbhani	10	8
Total		120	78 (65%)

In the present research work, out of 120 lactating goats screened with the help of MCMT, 78 goats were found positive for subclinical mastitis. So, the overall incidence of subclinical mastitis in and around Parbhani was 65%. The current findings were in agreement with Moshi *et al.* (1998) [13], Bawaskar (2000) [3], Muley *et al*. (2008) [14], Khangal (2009) [10] and Gupta *et al*. (2015) [8]. In contrary, Khan and Jafari (2000) [9] and Mishra *et al.* (2014) [12] reported overall incidence of subclinical mastitis lower than present results. The difference in incidence observed might be due to variation in breed, stage and number of lactations, environment and managemental practices in the farm. The reason behind highest incidence of SCM was poor managemental practices adopted by goat keepers.

The age wise overall incidence of subclinical mastitis is depicted in Table 2. Age wise incidence of subclinical mastitis among 50 lactating goats belonging to 2-3 years age group, 26 were positive for subclinical mastitis, depicting percent incidence as 52%. The age wise incidence in 3-4 years age group was 63.3% (19/30). The higher incidence of subclinical mastitis was found in goats 4 and above age group was 82.5% as (33/40). The streak canal of young animals contains waxy material that is chemically long chain fatty acids and has bacteriostatic properties. As the streak canal barrier deteriorated with age, infection susceptibility rate along with the number of lactations produced (Schalm *et al.* 1971) [17].

Table 2: Age wise incidence of Subclinical mastitis in goats

Sr. No	Age (Years)	No of goats screened	No. of goats +ve for SCM	Percent Incidence
1	2 -3	50	26	52.0%
2	3-4	30	19	63.3%
3	4 and above	40	33	82.5%
Total		120	78	65%

The lactation number wise incidence was recorded at different lactation number. The higher incidence observed at third lactation (81.6%) followed by second lactation (55%) and the lowest incidence of subclinical mastitis was recorded at first lactation (35%). Subclinical mastitis was more prevalent in goats with the highest lactation rank (Yahia *et al*. 2016) [21]. The lactation wise incidence of subclinical mastitis in goat depicted in Table 3.

Table 3: Lactation number wise incidence of Subclinical mastitis in goats

Sr. No	Lactation Number	Numbers of goat screened	Number of goats +ve for SCM	Percent Incidence
1	First	20	7	35.0%
2	Second	40	22	55.0%
3	Third	60	49	81.6%
Total		120	78	65%

The quarter wise incidence was recorded at right and left quarter. The left quarter showed slightly higher incidence (57.5%) than that of right quarter (41.6%). The total quarter wise infection rate was 49.58%. The results were similar as the quarter wise incidence reported by Mali (2015) [11] and Pirzada *et al.* (2016) [16]. The slightly higher rate of incidence in left quarter was may be attributed to more stress to left quarters in different managemental practices. The quarter wise incidence is depicted in Table 4.

Table 4: Quarter wise incidence of Subclinical mastitis in goats

Sr. No	Particulars of quarter	Number of quarters examined	Number of quarters +ve for mastitis	Quarter infection rate (QIR)
1	Right	120	50	41.6%
2	Left	120	69	57.5%
Total		240	119	49.58%

Conclusions

The 120 lactating goats screened with the help of MCMT, 78 goats were affected with subclinical mastitis and the overall incidence of subclinical mastitis in and around Parbhani was 65%. The higher incidence of subclinical mastitis is found in 4 and above years of age group. The first, second and third lactation showed percent incidence of subclinical mastitis 35%, 55% and 81.6% respectively. The quarter infection rate of subclinical mastitis in goat was 49.58%.

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