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**Dr. P Suman**

PG, Scholar,  
Department of Veterinary  
Medicine, College of Veterinary  
Science, Rajendranagar,  
Hyderabad, Telangana, India

**Dr. K Lakshmi**

Associate Professor, Department  
of Veterinary Medicine, College  
of Veterinary Science, Korutla,  
Jagtial, Telangana, India

**Dr. P Nagaraj**

Professor and Head, Department  
of Veterinary Medicine, College  
of Veterinary Science, Korutla,  
Jagtial, Telangana, India

**Dr. B Anil Kumar**

Assistant Professor,  
Department of Veterinary  
Pharmacology & Toxicology,  
College of Veterinary Science,  
Rajendranagar, Hyderabad  
Telangana, India

**Corresponding Author:**

**Dr. P Suman**

PG, Scholar,  
Department of Veterinary  
Medicine, College of Veterinary  
Science, Rajendranagar,  
Hyderabad, Telangana, India

## Incidence of clinical mastitis in goats

**Dr. P Suman, Dr. K Lakshmi, Dr. P Nagaraj and Dr. B Anil Kumar**

### Abstract

The present investigation “Diagnostic and therapeutic studies on clinical mastitis in goats” was under taken to study the incidence, etiology, diagnosis and therapeutic efficacy of certain drugs. Out of 260 quarters of 130 goats screened for clinical mastitis (CM), using different diagnostic tests, 54 quarters of 33 goats were found positive for clinical mastitis based on bacterial culture examination forming quarter-wise and animal-wise incidence as 20.77 and 25.38 percent, respectively. Age-wise incidence of clinical mastitis in lactating goats was recorded highest in 3-4yrs (45.45%) followed by 2-3yrs (30.30%), 4-5yrs (18.18%) and lowest in 1-2yrs (6.06%). Breed-wise incidence was highest in Jamunapari breed (63.64%) and lowest in Non-descript breeds (36.36%). Season-wise incidence was highest in rainy (48.48%) followed by winter (30.30%) and lowest in summer (21.21%) seasons. In relation to lactation number, highest incidence of CM was seen in 3<sup>rd</sup> lactation (45.45%) followed by 2<sup>nd</sup> lactation (30.30%) and lowest in 1<sup>st</sup> lactation (24.24%). Stage of lactation wise incidence was highest in early stage of lactation (42.42%) followed by mid stage of lactation (33.33%) and lowest in late stage of lactation (24.24%). Incidence in relation to quarter disposition was highest in right quarters (51.52%) followed by left quarters (30.30%) and lowest in both quarters (18.18%).

**Keywords:** goats, clinical mastitis, incidence, lactation number and quarter disposition

### 1. Introduction

Mastitis is caused by bacteria, fungus, mycoplasma, and yeast, as well as stress-reduced resistance, udder and teat form, animal heredity, and the environment, including milking and feeding systems, chemical, mechanical, or thermal damage (Radostits *et al.* 2007) [1]. In general, mastitis occurs in two forms which include clinical (overt) and sub-clinical forms. The clinical form of mastitis is subdivided into serous-catarrhal, purulent-catarrhal, and gangrenous and subclinical (hidden). Clinical mastitis (CM) is characterized by sudden onset of swelling, redness of the udder, pain, and reduced and altered milk secretion from the affected quarters. In addition, the milk may contain clots or flakes or become watery in consistency, accompanied by fever, depression, and anorexia (Faruq and Nikolai, 2019) [2]. Clinical examination of the mastitis-affected udder and milk aids in the identification of clinical mastitis. Milk composition changes are in direct proportion to the quantity and intensity of the inflammatory process (Singh *et al.* 2018) [3]. Mastitis is characterized by the release of leucocytes into the mammary gland, generally in reaction to bacterial invasion in the teat canal. Toxins released by the bacteria harm milk-secreting tissue and numerous ducts throughout the mammary gland. Abnormalities in the udder, such as swelling, heat, redness, or soreness, can be used to diagnose this condition. Mastitis can also be identified by changes in milk consistency, such as a watery appearance or the presence of flakes, clots, or pus (Foysal *et al.*, 2020) [4].

### 2. Materials and Methods

The present study was conducted to investigate clinical mastitis in goats that were presented to the Veterinary clinical complex and Veterinary Ambulatory Clinic of VCC, College of Veterinary Science, Rajendranagar, Hyderabad period of twelve months *i.e.*, from August, 2021 to July, 2022. The goats were physically examined for abnormalities of udder and milk samples were screened for the presence of mastitis condition. Data pertaining to age, breed, season, lactation number, stage of lactation and quarter disposition were collected in detail. The milk samples were collected from a total of 54 quarters of 33 lactating goats to diagnose clinical mastitis. Incidence of clinical mastitis was calculated taking into account the milk samples positive for bacterial growth out of total samples screened on animal and quarter basis irrespective of other tests performed.

### 3. Results and Discussion

In the present study, 54 quarters from 33 goats were diagnosed with clinical mastitis based on a cultural examination, MCMT and other diagnostic techniques forming quarter-wise and animal-wise incidence as 20.77% and 25.38% respectively (Table 1). These findings were in agreement with Rizwan *et al.* (2016) [5] who reported quarter-wise incidence of clinical mastitis as 21.70%. While, the animal wise incidence was 13.72% in goats. Similar findings were also reported by Jabber *et al.* (2020) [6] and Mohanty *et al.* (2019) [7], who recorded the incidence of clinical mastitis as 26.7% and 22.97%, respectively. On contrary, the highest prevalence of 43.00% and 40.50% was reported by Foysal *et al.* (2020) [4] and Gabli *et al.* (2019) [8] respectively. However, lower incidence of 16.74%, 11.67%, 6.9% and 4.29% has been reported by Saleem *et al.* (2019) [9]; Ferdous *et al.* (2018) [10]; Mohanty *et al.* (2022) [11] and Mugabe *et al.* (2017) [12], respectively. This variation in incidence could be due to environmental factors and varying animal breeds, fluctuation of the immune response, housing and management systems, usage of different diagnostic methods and different levels of expertise for diagnosis, and the varying interpretation of the results (Jabber *et al.*, 2020) [6]. In the present investigation, the age-wise incidence was highest in the goats aged between 3-4 years (45.45%), followed by 2-3 years (30.30%), 4-5 years (18.18%) and 1-2 years (6.06%) (Table 2). These findings were similar to Foysal *et al.*, 2020 [4] who reported a higher incidence of CM among goats aged between 3 and 4 years (53.66%) and the lowest incidence of 28.57% among goats < 2 years. Similar findings were reported by Saleem *et al.* (2019) [9]; Biswas *et al.* (2021) [13] and Mohanty *et al.* (2022) [11] who recorded higher incidence of mastitis in 3-5 years, 4 years and 3 to 4 years old lactating does respectively. On the contrary, Ferdous *et al.* (2018) [10] and Amin *et al.* (2011) [14] recorded the highest prevalence of clinical mastitis among goats aged > 4 years and 5 years, respectively. Age is the most significant factor in determining the prevalence of mastitis in goats. In goats increased milk cell count has been reported to be elevated with increasing age and lactation. Since mastitic animals are not immediately culled, and acute cases may become chronic with the passage of time (Kumar *et al.*, 2016) [15]. In the present study, the breed-wise incidence was highest in Jamunapari breed (63.64%) and lowest in Non-descript breeds (36.36%), respectively (Table 3). These findings were in accordance with Foysal *et al.* (2020) [4]; Koop *et al.*, (2016) [16] and Akter *et al.*, (2020) [17] who reported higher incidence of clinical mastitis in Jamunapari breed. In a study, Rizwan *et al.* (2016) [5] recorded lowest incidence of 18.60% among non-descriptive goat breeds. On the contrary, Mohanty *et al.* (2022) [11] reported a higher prevalence of mastitis in nondescript goats (48%). Jamunapari breeds may have longer lactations and therefore are longer at risk of mastitis. Furthermore, the udder conformation of this breed may predispose it to mastitis (Koop *et al.*, 2016) [16]. In the present study, season-wise incidence of clinical mastitis in goats was highest in rainy (48.48%) followed by winter (30.30%) and lowest in summer (21.21%) seasons, respectively (Table 4). These findings were similar to Gupta *et al.* (1999) [18]; Okoli *et al.* (2006) [19]; Megersa *et al.* (2010) [20]; Koop *et al.* (2016) [16] and Mohanty *et al.* (2022) [11] who reported the highest number of mastitis cases in the rainy season. On contrary, Rashid *et al.* (2017) [21] documented a higher occurrence of mastitis in winter (21.68%) followed by summer (25.70%) seasons and concluded that, the occurrence of mastitis was more in summer than in winter seasons. During the rainy

season, food is scarce and many goats are kept inside, intensifying the contact between the animals and worsening the hygienic situation, which may lead to a higher incidence through increased transmission and a weakened immune system. Traveling is more difficult and takes more time, limiting people in their ability to bring their animal to the hospital before it dies from the disease (Koop *et al.*, 2016) [16]. In the present investigation, the incidence of clinical mastitis in relation to lactation number was revealed to be highest in 3<sup>rd</sup> Lactation (45.45%) followed by 2<sup>nd</sup> Lactation (30.30%) and lowest in 1<sup>st</sup> Lactation (24.24%) respectively (Table 5). These findings were in agreement with Akter *et al.* (2020) [17]; Foysal *et al.* (2020) [4]; Saleem *et al.* (2019) [9] and Mohanty *et al.* (2022) [11] who reported the highest incidence of mastitis in 3<sup>rd</sup> Lactation. On the contrary, Kumar *et al.* (2016) [15] and Ferdous *et al.* (2018) [10] reported a higher occurrences of mastitis in >4<sup>th</sup> lactation and 5<sup>th</sup> lactation, respectively. The chance of mastitis is directly proportional to parity as animal to face more numbers of infections depending upon the environmental conditions, milking practices and sanitations (Saleem *et al.*, 2019) [9]. The protracted exposure of multiparous animals to pathogens increases the prevalence of disease in comparison to primiparous or with less parity animals (Kumar *et al.*, 2016) [15]. In another study, it is assumed that at old age, there are added burdens and stress on the body due to high milk production for longer period and multiple numbers of parity. As a result, immune systems of such animals are badly affected with the infectious agents leading to mastitis (Ali *et al.*, 2010) [22]. Incidence of clinical mastitis in relation to lactation stage was highest in early stage of lactation (42.42%) followed by mid stage of lactation (33.33%) and lowest in late stage of lactation (24.24%) respectively (Table 6). In the present investigation, quarter-wise disposition of clinical mastitis in lactating goats was recorded highest in right quarters (51.52%) followed by left quarters (30.30%) and lowest in both quarters (18.18%) respectively (Table 7). These findings were in agreement with Kumar *et al.* (2016) [15] and Pirzada *et al.* (2016) [23] who reported highest incidence of 52.70% and 56.58% in right-quarters mastitis affected goats, respectively. On contrary, Sarker and Samad (2011) [24] and Kumar *et al.* (2016) [15] recorded a higher prevalence of clinical mastitis in left udder-halves in comparison to the right udder-halves. The higher prevalence of infection in right quarters was due to feeding goats to their full capacity, the rumen gets engorged, and the animal tends to lie on its right side resulting in direct contact of right-sided teats with the ground which harbors microbes (Shittu *et al.*, 2008) [25].

**Table 1:** Incidence of clinical mastitis in goats.

S. No	Occurrence	No. of goats screened	No. of goats affected	Percentage
1	Quarter-wise	260	54	20.77
2	Animal-wise	130	33	25.38

**Table 2:** Age-wise incidence of clinical mastitis in goats.

S. No	Age groups	Number of goats affected (n=33)	Incidence (%)
1	1-2yrs	2	6.06
2	2-3yrs	10	30.30
3	3-4yrs	15	45.45
4	4-5yrs	6	18.18

**Table 3:** Breed-wise incidence of clinical mastitis in goats.

S. No	Breed	Number of goats affected (n=33)	Incidence (%)
1	Jamunapari	21	63.64
2	Non-descript breeds	12	36.36

**Table 4:** Season-wise incidence of clinical mastitis in goats.

S. No	Season	Number of goats affected (n=33)	Incidence (%)
1	Rainy	16	48.48
2	Winter	10	30.30
3	Summer	7	21.21

**Table 5:** Incidence of clinical mastitis in goats in relation to lactation number.

S. No	Lactation number	Number of goats affected (n=33)	Incidence (%)
1	1 <sup>st</sup> Lactation	8	24.24
2	2 <sup>nd</sup> Lactation	10	30.30
3	3 <sup>rd</sup> Lactation	15	45.45

**Table 6:** Incidence of clinical mastitis in goats in relation to stage of lactation.

S. No	Stage of Lactation	Number of goats affected (n=33)	Incidence (%)
1	Early stage of Lactation	14	42.42
2	Midstage of Lactation	11	33.33
3	Late stage of Lactation	8	24.24

**Table 7:** Incidence of clinical mastitis in goats in relation to quarter disposition.

S. No.	Quarter disposition	Number of goats affected (n=33)	Incidence (%)
1	Right quarter	17	51.52
2	Left quarter	10	30.30
3	Right quarter and Left quarter	6	18.18

#### 4. Acknowledgment

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