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VB Shelke

Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

Sakhare MP

Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

Siddiqui MFMF

Department of Veterinary clinical medicine, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

Waghmare RN

Department of veterinary public health, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

Jadhav ND

Department of Veterinary Pharmacology and Toxicology, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

AS Tawheed

Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

Corresponding Author:

VB Shelke

Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and Animal Sciences, MAFSU, Parbhani, Maharashtra, India

Prevalence of subclinical mastitis in dairy cows in and around Parbhani

VB Shelke, Sakhare MP, Siddiqui MFMF, Waghmare RN, Jadhav ND and AS Tawheed

Abstract

The present epidemiological studies of “subclinical mastitis in cows in and around parbhani area” to study the incidence of subclinical mastitis in cows, was carried out during. The period of study comprised from February 2019 to July, 2019. The cows population for subclinical mastitis were screened by using SCC test as reference and MCMT, pH and EC as indirect diagnostic tests. In the present study, total 512 cows were screened for the prevalence of sub clinical mastitis. Prevalence according breed, The investigation for subclinical mastitis was done by using reference tests such as SCC while, MCMT, PH and EC. Prevalence in H.F and native breed was 36.64% (48) and 30.97% (118). Age-wise prevalence was 30.19%, 39.56%, 17.08 % in young, adult and old age respectively. Lactation stage wise early (1-3), mid (3-6) and late (6-9) was 34.88%, 30.19, 19.23% on basis of SCC. 25.73%, 32.66%, 17.64%, Lactation number-wise. Quarter type-wise LF, LH, RF, RH was 21.48%, 35.93%, 15.82%, 29.88% prevalence in one, two, three, and four quarter was 1.7, 15.23, 11.71 and 3.51 respectively.

Keywords: prevalence, subclinical mastitis, dairy cows, diagnostic tests

Introduction

Milk has long been used as a healthy drink due to its variety of nutrient. Cow milk having many important health benefits, including its ability to build bones and teeth, boost the immune system, eliminate inflammation and help to stimulate growth. Subclinical mastitis is characteristic by the no visible changes in quarters and milk, or the existence of inflammation without presence of gross visible effect on milk signs [14]. Average loss of milk yield due to subclinical mastitis is up to 17.5% [12]. Subclinical mastitis form in dairy cows is more important due to 15-40 time more prevalence than clinical mastitis, its long duration, difficult to detect, perpetual economic loss for longer duration, adverse effect on milk quality which usually goes unnoticed and if not properly attended, lead to clinical form of mastitis [13]. Mastitis is one of the important production diseases of dairy animals worldwide, as it causes great financial losses due to lowered milk yield and milk quality and cost of treatment, labour and discarded milk during infection.

Materials and Methods

The cow population from Instructional Livestock Farm Complex, COVAS, Parbhani, different gaushalas, various organized and unorganized farms, local dairy farms in and around Parbhani were formed the materials of the research project. The dairy cow population irrespective of their age, breed, stage and lactation number were screened for detecting normal and elevated levels of SCC in the milk. The period of study comprised from February 2019 to July, 2019. The cows showing raised levels of SCC without any clinical manifestations constituted the study materials. The cows population for subclinical mastitis were screened by using SCC test as reference and MCMT, pH and EC as indirect diagnostic tests. The cow were grouped into different category viz. young, adult and old, based on their age. The prevalence of subclinical mastitis in cows on the basis of age groups, i.e., young (3.5-6 years), adult (6-8 years) and older (More than 8 years) was studied using different diagnostic tests such as SCC, MCMT, pH and EC. The lactation number wise prevalence early below three month, mid lactation in between three to six months, above six months as late lactation. Data pertaining to breed, age, lactation number, stage of lactation, milk yield.

Results and Discussion

A total 512 cows were screened from different areas of the Parbhani district for diagnosis of

subclinical mastitis. Out of 512 cows screened, 134 (26.17%) cows were found positive for SCM on the basis of SCC. The

overall prevalence of subclinical mastitis in cows by various diagnostic tests was presented in Table 1.

Table 1: Prevalence of subclinical mastitis in cows detected by various diagnostic tests

Sr. No.	Mastitis	Cow screened	Diagnostic tests							
			SCC (x10 ³)		MCMT		pH		EC (mS/cm)	
			Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)
1	Subclinical	512	134	26.17	120	23.43	99	19.33	90	17.57
	Overall									

The findings in the present study were similar to the observations of Dar *et al.*, (2014) [3], Kathiriya *et al.*, (2014) and Sheikh *et al.*, (2018) [11]. The prevalence was lower than the finding of Rabbani and Samad (2010) Siddiquee *et al.*, (2013), Santharan *et al.*, (2016), Gupta *et al.*, (2017) and Devi *et al.*, (2018) and higher as compared to Yadav (2018) [13]. The prevalence of subclinical mastitis varied from farm to farm, depending on the management system as stated by

Radostits *et al.*, (2009).

The breed wise prevalence of subclinical mastitis in HF cross bred cow as per different diagnostic tests SCC, MCMT, PH and EC, the prevalence of SCM was 36.64% (48), 32.06 (42), 29% (38) and 27.48% (36), respectively. Whereas, in indigenous cow the prevalence was 30.97% (118), 28.34% (108), 24.14% (92) and 22.30% (85), respectively.

Table 2: Breed-wise prevalence of subclinical mastitis in cows

Sr. No.	Breed	Cow screened	Diagnostic tests							
			SCC (x10 ³)		MCMT		pH		EC (mS/cm)	
			Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)
1	HF Cross	131	48	36.64	42	32.06	38	29.00	36	27.48
2	Native	381	118	30.97	108	28.34	92	24.14	85	22.30

Regarding breed- wise prevalence findings were in agreement with Dasohari *et al.*, (2017) [4] and Yadav (2018) [13], but disagreed with the results of Kathiriya *et al.*, (2014), Qadri *et*

al., (2017) and Sharma *et al.*, (2018). The breed wise prevalence of SCM was depicted in Table 2.

Table 3: Age-wise prevalence of subclinical mastitis in cows

Sr. No.	Age (Year)	Cow screened	Diagnostic tests							
			SCC (x10 ³)		MCMT		pH		EC (mS/cm)	
			Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)
1	3.5-6 (Young)	255	77	30.19	70	27.45	64	25.09	60	23.52
2	6-8 (Adult)	139	55	39.56	49	35.25	40	28.77	36	25.89
3	>8 (Old)	158	27	17.08	25	15.82	20	12.65	18	11.39

The age wise prevalence reported in present study was similar to the observations of Dasohari *et al.*, (2017) [4], and Sheikh *et al.*, (2018) [11]. The higher prevalence of SCM (84.4%) in more than 7 years old cows and stated that prevalence of SCM was significantly increasing with the advancement of the age was reported by Siddiquee *et al.*, (2013). The highest prevalence in age group of 7-10 year followed by age more than 10 year and 3-6 year recorded by Kurjogi and Kaliwar (2014). In present study, adult age group of cows were more susceptible for subclinical mastitis which may be due to increased milk production, nutrition stress, less immunity

which was also reported by Sheikh *et al.*, (2018) [11]. High prevalence of SCM in older cows has been attributed to dilated teat canal in older animals that remains partially open permanently owing to years of repeated milking (Madut *et al.*, 2009).

The prevalence of subclinical mastitis in early lactation cows diagnosed by various tests such as SCC, MCMT, pH and EC was 34.88 %, 3.39 %, 26.35 % and 24.03%, respectively. While, in mid lactation prevalence was 30.19%, 28.21%, 26.35% and 24.03% and in late lactation subclinical mastitis was 19.23%, 17.30%, 13.46% and 9.61%, respectively.

Table 4: Lactation stage wise prevalence of mastitis in cows

Sr. No.	Lactation Stage (Month)	Cow screened	Diagnostic tests							
			SCC (x10 ³)		MCMT		pH		EC (mS/cm)	
			Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)
1	Early (1-3)	258	90	34.88	81	31.39	68	26.35	62	24.03
2	Mid (3-6)	202	61	30.19	57	28.217	51	25.24	45	22.27
3	Late (6-9)	52	10	19.23	9	17.30	7	13.46	5	9.61

The present observations were in agreement with Gupta *et al.* (2017) and Swami *et al.* (2017). Early stage of lactation cow goes through many physiological changes in body leading to constant stress and decreased immune status Sheikh *et al.*

(2018) [11]. The current results are in line with these observations. The lactation number wise prevalence of subclinical mastitis tested by SCC, MCMT, pH, and EC was presented in Table 5.

Table 5: Lactation number-wise prevalence of subclinical mastitis in cows

Sr. No.	Lactation Number	Cow screened	Diagnostic tests							
			SCC ($\times 10^3$)		MCMT		pH		EC (mS/cm)	
			Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)
1	1-3	342	88	25.73	82	23.97	70	20.46	66	19.29
2	4-6	119	65	32.66	57	47.89	51	42.85	44	36.97
3	7-9	51	9	17.64	7	13.72	5	9.8	4	7.84

Prevalence in 1-3 lactation was 25.73% (88), 23.97% (70), 20.46% (70), and 19.29% (66). In the 4-6 lactation prevalence was 32.66 % (65), 47.89 % (57), 42.85 % (51) and 36.97 % (44). While, in more than seven lactation, prevalence of subclinical mastitis was 17.64% (9), 13.72% (7), 9.8 % (5) and 7.84 % (4), respectively. The present findings corroborates with the Gupta *et al.*, (2017) and Swami *et al.*,

(2017). The prevalence of SCM was significantly high (78.4%) in cows with parity more than five and increased with the number of parity in cows (Sharma *et al.*, 2007 and Siddiquee *et al.*, 2013).

The quarter type-wise prevalence of subclinical mastitis in cows recorded with different diagnostic tests as SCC, MCMT, pH and EC was depicted in Table 6.

Table 6: Quarter type-wise prevalence of subclinical mastitis in cows

Sr. No.	Type of Quarter	Quarter screened	Diagnostic tests							
			SCC ($\times 10^3$)		MCMT		pH		EC (mS/cm)	
			Quarter positive	Prevalence (%)	Quarter positive	Prevalence (%)	Quarter positive	Prevalence (%)	Quarter positive	Prevalence (%)
1	LF	512	110	21.48	83	16.21	75	14.64	68	13.28
2	LH	512	184	35.93	167	32.61	131	25.58	120	23.43
3	RF	512	81	15.82	74	14.45	63	12.30	55	10.74
4	RH	512	153	29.88	137	26.75	120	23.43	109	21.28
Total		2048	528	25.78	461	22.50	389	18.99	352	17.18

Prevalence of SCM in the LF quarter was 20.81% (110), 16.21% (83), 14.64% (75) and 13.28% (68). In the LH quarter was 35.93% (184), 32.61% (167), 25.58% (131) and 23.43% (120). While, in the RF quarter was 15.82% (81), 14.45% (74), 12.30% (63) and 10.74% (55) and in the RH quarter was 29.88% (153), 26.75% (137), 23.43% (120) and 21.28% (168), respectively.

In the current study, increased incidence of subclinical mastitis was noted in right hind and left hind, which may be due to increased exposure of both quarters to dung and urine of animals. The present results are in agreement with the observation of (Chakrabarti 2007, Swami *et al.*, 2017 and Sheikh., 2018) [11].

Table 7: Quarter number-wise prevalence of subclinical mastitis in cows

Sr. No.	Quarter distribution	Cows screened	Diagnostic tests							
			SCC ($\times 10^3$)		MCMT		pH		EC (mS/cm)	
			Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows positive	Prevalence (%)	Cows Positive	Prevalence (%)
1	One quarter	512	9	1.7	7	1.3	6	1.17	4	0.78
2	Two quarter	512	78	15.23	68	13.28	46	8.98	32	6.25
3	Three quarter	512	60	11.71	56	10.93	38	7.4	29	5.66
4	Four quarter	512	18	3.51	15	2.92	12	2.34	10	1.95
Total			165	32.15	146	28.43	102	19.89	75	14.64

As per number of quarter, prevalence in one quarter was 1.7% (9), 1.3% (6), 1.17% (6) and 0.78% (4) and in two quarter prevalence was 15.23% (78), 13.28% (68), 8.98% (32) and 6.25% (32), respectively. Whereas, in three quarter wise prevalence was 11.71 % (60), 10.93 % (56), 7.4 % (38) and 5.66 % (29), all four quarters was 3.51% (18), 2.92% (15), 2.34% (12) and 1.95% (10), respectively. Similar finding was observed by Dasohari *et al.*, (2017) [4]. While, Yadav (2018) [13] reported involvement of single and double quarter type 88.30% and 11.70, respectively. In the current research, higher infection rate and two-quarter infection were noted in the left hind quarter. Overall 90.26% quarter wise prevalence was recorded by Devi *et al.*, (2018).

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