

Prevalence of sub clinical mastitis in small holder dairy farms in Selale, North Shewa Zone, Central Ethiopia

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Citation

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Abstract

A cross section study was carried out on a total of 153 lactating cows for sub clinical mastitis by using California Mstitis Test (CMT). Of all animal tested 137 (89.54 %) were found positive for mastitis. From 137 CMT positive animals, 122 were bacteriologically positive. The prevalence of sub clinical mastitis 89.54 % in cow and 63.1 % quarters were recorded and the resulting quarter infection rate was 56.70 %. Bacteria belonging to Staphylococcus genera were isolated with Staphylococcus epidermedius (38.41 %), Staphylococcus intermedius (23.19 %) and Staphylococcus aureus (13 %) dominating the milk flora. The high prevalence of sub clinical mastitis found in cow in the study was required further studies to identify risk factors and antibiotic sensitivity tests for the isolates as this would help to devise treatment and control of sub clinical mastitis in dairy cows in the area.

INTRODUCTION

Bovine mastitis is a single most common disease syndrome in adult dairy cows, accounting for about 38% of morbidity (Smith, 1996). Mastitis is also associated with number of zoonotic diseases in which milk acts as a vehicle of infection (Jenkins, 1982)

Previous study on the prevalence of mastitis indicated 10% of cows in most farms in Ethiopia have at least one blind quarter (Goshu et al., 1985). A study conducted by Mohammed (1996), on bacterial cases of bovine mastitis in Zebu-Holstein dairy cows in Wondo-genet area also found a quarter infection rates of 16% by potentially pathogenic bacteria. The prevalence of bovine mastitis is higher in farms with larger herd sizes than in those with lower herd sizes (Radostits et al., 2000). The prevalence is also higher in cows with lesions and tick infestations on the skin, udders and teats than cows without these factors, in early lactation stage than in the mid-lactation stage (Biffa et al., 2005).

North Shewa is a high potential cereal-livestock zones where dairy activities play a significant role in the livelihood of farmers in the area. Considering the potential of the area and the economic significance of dairy production to the local community there have been repeated efforts by governmental and non-governmental aid organizations to improve the dairy productivity. This area has also better access to livestock development services (governmental and

non-governmental) and milk markets than other rural areas. Due to the above mentioned reasons and the economic capacity of the peasants small-holder dairy production with crossbred dairy cattle is a common practice in the area. Conversely, bovine mastitis was reported to be one of the most prevalent dairy health problems in most parts of Ethiopia where dairy activities are practiced. Yet, the information on the prevalence of sub clinical mastitis in the area is lacking and what available is fragments of information from cases of clinical mastitis that has been presented to veterinary clinic for the treatment. This investigation was proposed to determine the prevalence of sub clinical mastitis and to isolate the dominant bacteria in the study area.

MATERIALS AND METHODS

DESCRIPTION OF THE STUDY AREA

This study was carried out in North Shoa Zone of the Oromia Regional state in central Ethiopia from March – April 2000. The study area is located 190 km north west of Addis Ababa in North Shoa Zone of the Oromia Regional state in central Ethiopia. It covers 1174500 ha of land from which 40% is crop land, 25% is grazing land, 13% is forest and bush area, 7% is construction area and 15% is unproductive land. The cattle population is about 1113200. 42% of the area is highland that is suitable for crop cultivation and livestock husbandry and the herd structure is

characterized by a higher number of cows. The area has 2 annual rainy seasons: from February-May (short rainy season) and from June- October (long rainy season).

SELECTION OF THE STUDY ANIMALS

In the study, apparently health animals were considered. Those with clinical mastitis were excluded. A total of 153 apparently health lactating dairy cow (Friesian X local indigenous zebu) were selected in this study.

SCREENING OF THE UDDER QUARTER FOR MASTITIS

All udder quarters from 153 cows were screened for infection using CMT. Milk was collected from individual quarters into mastitic paddle wells, ensuring that the first strips were discarded. The procedures and the interpretation were according to Quinn et al.(1994) using CMT test, the results were classified as either negative or positive depending on the intensity of the reaction. Samples with a CMT score of 0 or 1 considered negative, while those with CMT scores of 2 or 3 were subjected to culture (Miller and Keans, 1967). The result of the test was recorded on the basis of gel formation.

BACTERIAL CULTURE

From all milk samples a standard of 0.01 ml of milk sediment was removed and cultured on blood agar and MaCconkey agar. Bacterial growth was identified and recorded after 24 and 48 hour of incubation. Identification of bacteria was made on the basis of standard features and procedures (Carter and Changapga, 1991)

DATA ANALYSIS

Percentages were used to express the prevalence and the proportion of the isolates of the different general of bacteria that causing mastitis in the area.

RESULTS

A total of 153 apparently health lactating cows were examined for sub clinical mastitis by using CMT and 137 (89.5 %) was found positive for mastitis. From 137 CMT positive animals, 122 were bacteriologically positive. Out of 612 quarters, 386 (63.1 %) were infected. All positive quarters milk samples were cultured and 90 % (347 of 386) yielded growth and in the remaining 10 % (39/386) there was no observation of growth (Table 1). The resulting quarter infection rate was 56.7 % (347/612). After culturing the following dominant isolates were found to be *Staphylococcus epidermedius*, *Staphylococcus intermedius*,

Staphylococcus aureus, *Micrococcus*, *Staphylococcus hyius* sub spp *hyius* respectively. Bacteria belonging to *Staphylococcus* genera were isolated with *Staphylococcus epidermedius* (38.4%), *Staphylococcus intermedius* (23.2 %) and *Staphylococcus aureus* (13 %) dominating the milk flora (Table 2).

Figure 1

Table 1: Mastitis in udder quarters of small holder dairy cows in Selale, North Shewa Zone, Central Ethiopia

Description	Number examined				Total	%
	RB	RF	LB	LF		
CMT positive	89	92	111	94	386 (347*)	63.1
CMT negative	64	61	42	59	226	36.9
% infected	58.2	60.1	72.5	61.4	63.1 (56.7*)	100

RB= right back , RF= right front, LB= left back, and LF= left front

* culture positive quarter and quarter infection rate

Figure 2

Table 2: Frequency of microorganisms isolated from cows milk samples

No	Mastitis pathogens	Percentages
1	<i>Staphylococcus epidermedius</i>	38.41%
2	<i>Staphylococcus intermedius</i>	23.19%
3	<i>Staphylococcus aureus</i>	9.42%
4	<i>Micrococcus</i>	5.80%
5	<i>Staphylococcus hyius sub spp hyius</i>	5.07%
6	<i>Staphylococcus saprophyticus</i>	2.17%
7	<i>Staphylococcus bovis</i>	2.17%
8	<i>Staphylococcus pygoneous</i>	1.45%
9	<i>Proteus mirables</i>	1.45%
10	<i>Provedercia alclificanis</i>	1.45%
11	<i>Corynebacterium bovis</i>	1.45%
12	<i>Corynebacterium hemolyticum</i>	1.45%
13	<i>Streptococcus pyogenus</i>	1.45%
14	<i>Aeromonas hydrophileus</i>	0.72%
15	<i>Pasturella Multocida</i>	0.72%
16	<i>Alcaligenes spp</i>	0.72%
17	<i>Pasturella hemolyticum</i>	0.72%
18	<i>Candida krusei</i>	0.72%
19	<i>Corynebacterium pyogenus</i>	0.72%
20	<i>Pseudomonas aeroganosa</i>	0.72%
	Total	100%

DISCUSSION

The prevalence of sub clinical mastitis 89.5 % in cow and 63.1 % quarters found in this study was higher than the prevalence (62.9 % and 33.74 %) reported by Kerro Deogo and Tarek (2003) and Seyoum et al (2003), respectively. The difference in prevalence observed between the reports from different parts of Ethiopia and the present study may be due to differences in management and husbandry condition in the area and lack of awareness of farmers to the loss caused by mastitis.

Staphylococcus was the predominant organism isolated from the sub clinical mastitis and followed by Micrococcus, Streptococcus and other Gram positive rods in decreasing order. Similar organisms were isolated from cases of mastitis by other authors (Kerro Deogo and Tarek 2003; Seyoum et al

2003). It is well established that Staphylococcus species and many of the streptococcus species, inhabiting the udder and/or on the udder skin, cause contagious mastitis. The transmission of contagious mastitis from infected udder to health udder is through milker's hand during milking processes and possibly flies.

The present study showed high prevalence of sub clinical mastitis in cow in the study area. The isolated mastitis causing pathogens were many of which Staphylococcus, Micrococcus and Streptococcus are the major one. Further studies are required to identify risk factors for sub clinical mastitis and antibiotic sensitivity tests as this would help to devise treatment and control of sub clinical mastitis in dairy cow in the area.

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References

- r-0. Abaineh, D. and Sinayehu, A. 2001: Studies on prevalence of sub clinical mastitis in and around Addis Ababa. Tropical animal health and production, 33,511.
- r-1. Carter, G.R. and Chengappa, M. M., 1991. Bacteria. Essentials of veterinary Bacteriology and Mycology, 4th edn, (Lea and Febiger, Philadelphia), 109-243
- r-2. Damelash, Biffa, Etana, Debela, Fekadu, Beyene. 2005. Prevalence and Risk Factors of Mastitis in Lactating Dairy Cows in Southern Ethiopia. Intern. J. Appl. Res. Vet. Med. Volume 3, Number 3.
- r-3. Ethiopia. Bull.Anim.prod .Afr. 51:182-189.
- r-4. Goshu, M., kasahun, D. and Tesfaye ,A., 1985. A study of the state farm. Ethiopian Journal of Agricultural science, 11:26-30.
- r-5. Hunderra Sori, Adem Zerihun, and Sintayehu Abdicho. 2005. Dairy Cattle Mastitis in and around Sebeta, Ethiopia. Intern. J. Appl. Res. Vet. Med. Volume 3, Number 4.
- r-6. Jenkins P.A. (1982): Diagnostic Bacteria, Biology of Microbacteria, Academic press, London
- r-7. KerroDeogo,O.and Tarek,F.2003: Bovine mastitis in selected areas of southern Ethiopia. Tropical Animal Health and Production. 35 (3): 197-205
- r-8. Millar, D.D. and Kearns, J.V., 1967. Effectiveness of California mastitis test as a measurement of the leucocyte content of quarter samples of milk. Journal of Dairy Sciences, 50, 683-686
- r-9. Mohammed, A., 1996. bacterial causes of bovine mastitis in Wondo-genet. Ethiopia. Journal of Veterinary medicine B, 43, 379- 384
- r-10. Quinn PJ, Carter ME, Markey B, Carter GR: Clinical Veterinary Microbiology. Wolf publishing, London, England: 1999:327-344.
- r-11. Radostits, O.R., Blood, D.C., Gay, C.C., and Hinchcliff, K.W., 2000: Mastitis. In: Veterinary Medicine, A

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textbook of the diseases of cattle, sheep, goats, and horses. 8th ed. Bailler Tindall, London. pp. 603-700.

r-12. Seyoum, T., Ameni, G., and Ashenafi, M. 2003: The prevalence of bovine mastitis, bacterial isolation and their susceptibility to antibiotics in central Ethiopia. Bulletin of

animal health and production in Africa, 52, 182-189.

r-13. Smith B.P. 1996: Large Animal Internal Medicine: Diseases of Horses, Cattle, Sheep, and Goats , 2nd edition, Mosby-year book, U S A, 1177-1188

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