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

K Argaw, T Tolosa

Abstract
A cross section study was carried out on a total of 153 lactating cows for sub clinical mastitis by using California Mastitis 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 (Radostitis 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
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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 (Friessian 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 hyiuis 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).

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Number examined</th>
<th>Total</th>
<th>%</th>
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<tbody>
<tr>
<td>CMT positive</td>
<td>29 92 111 94 386 (547*)</td>
<td>612</td>
<td>63.1</td>
</tr>
<tr>
<td>CMT negative</td>
<td>64 61 42 59 226</td>
<td>36.9</td>
<td></td>
</tr>
</tbody>
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EB= right back, EF= right front, LB= left back, and LF= left front

* culture positive quarter and quarter infection rate
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 Dego 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 Dego 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


Author Information

Kifle Argaw, DVM, DIP
Ministry of Agriculture Department of Wildlife Conservation

Tadele Tolosa, DVM, MVSC
College of Agriculture and Veterinary Medicine, Jimma University