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Introduction

Ethiopia, located in tropical region and the country is greatly dependent on Agriculture. Livestock production represents a major national resource and forms an integral part of the Agricultural production system and livelihood of the society. Ethiopia has the largest cattle population in Africa with an estimated population of 56.71 million [1]. Among this cow represents the biggest portion of cattle population of the country, around 20.7% of the total cattle heads are milking cows [1]. However, milk production o en does not satisfy the country's requirements due to a di erent of factors. Of these factors, Mastitis is one the factors contributing to reduced milk production [2]. Mastitis is also associated with number of zoonotic diseases in which milk acts as a vehicle of infection [3].

Mastitis is de ned as an in ammation of the parenchyma of mammary gland, which can reduce milk yield and alter milk composition [4]. e occurrence of disease is an outcome of interplay between three major factors: Infectious agents, Host resistance, and Environmental factors [5]. Mastitis in dairy cows occurs worldwide and can be caused by infections with bacteria, yeast and fungi [6]. ere are two main classes of Mastitis. e rst is clinical Mastitis, which manifests signs observed from the animal or the milk. e other is Subclinical Mastitis, which produces no visible signs from the udder except when using diagnostic tools. Despite many years of research, subclinical Mastitis remains the most economically damaging and zoonotic potential disease for dairy industry and consumer

Several of these studies have shown the occurrence of a range of Mastitis causing bacteria, indicating *S. aureus*, *Escherichia coli* and *Streptococcus* species as dominant and pathogenic species, clinical Mastitis is readily apparent and easily detected. In contrast, detection

Results and Discussion

Risk factors

Di erent authors have di erent idea regarding the predisposing factors of Mastitis in Ethiopia but most of them do agree on

Early stage and the period of involution (late stage) of the mammary glands were the most susceptible stages. is is possibly due to absence of dry cow therapy regime that is considered major factor contributing to high prevalence at early lactation [2].

Parity

e likelihood of Mastitis is higher in multiparous cows having four or more calvings compared with primiparous cows as studies conducted in Ethiopia shows (Table 6). is partly, might be associated with the position of udder in older cows. us, all of the older cows particularly those with four or more parity had pendulous udder and it has also stated that cows with the most pendulous quarters appear to be the most susceptible to mammary infections [20].

Prevalence of Mastitis is signi cantly associated with milking hygienic practice. Cows at farms with poor milking hygiene standard are severely a ected than those with good milking hygiene practices [13,14]. is might be due to absence of udder washing, milking of cows with common milkers' and using of common udder cloths, which could be vectors of spread especially for contagious Mastitis. Again, the prevalence is also high in animal with udder or teat injury than those with no injury [33].

Prevalence of Mastitis at cow level is higher in those farms<4 years' duration of farming, feed provision before milking and milking of clinical cows at any stage, poor drainage/slope for stable area which results accumulation of liquid such as urine and water used for cleaning of udders during milking, the liquid material mixed with the feces of the cows that led to dirty udder and teat there infection could enter [54-56]. e occurrence of Mastitis based on body condition and history of previous Mastitis was also reported [49].

Diagnostic Method Used

Clinical examination of Mastitis

Clinical examination was conducted to determine prevalence of clinical Mastitis. Udder was examined for visible abnormalities, symmetry, size, consistency, presence of lesions and/or ticks. Clinical Mastitis was recognized by some pathology in udder, which is manifested by sign of in ammation like swelling, pain, redness and heat in case of acute Mastitis. Whereas, hardening of the udder, blockage of the teats, atrophy or brosis and abscess formation were manifested in chronic Mastitis. Acute Mastitis was also recognized by change in milk color, presence of akes and clots [48].

California Mastitis test (CMT)

is California Mastitis test (CMT) a screening test for subclinical Mastitis. is test is preferred to be screening tests for subclinical Mastitis as they can be used easily, yielding rapid as well as satis ed result which was used by taking a small sample of milk (approximately ½ teaspoon) An equal amount of CMT reagent was added to the milk and the paddle rotated to mix the contents. A er approximately 10

1-3	346	61.6**
4-7	98	90.8*
1-3 Calves	- ş	6ıN p l'

seconds, the score was read while continuing to rotate the paddle. Results were recorded as T (trace), 1, 2 or 3 based on the level of precipitation (coagulation) [57].

Surf eld Mastitis test

e samples were subjected to surf test. For this purpose, 3% Surf solution was prepared by addition of three grams of commonly used detergent powder 3 gm surf (Surf Excel, Unilever, Pakistan) in 100 ml of distilled water. Milk samples and surf solution were then mixed in equal quantities in Petri dishes. e formation of gel depicted the positive samples [58].

Indicator paper test

is test technique is used as screening test to determine the prevalence of subclinical in animal. Milk sample were tested using the paper by adding milk sample to test paper and observing the color change of paper. Sample is negative if the yellow color of paper is not changed or shows a slight change in color. A change of color from yellow to green or bluish green was recorded as positive [48].

White side test

e principle of this test is based on the increased number of leukocyte in mastitic milk. Milk sample are placed on a clean dry glass slide and add a drop of 4% sodium hydroxide and mix with a glass rod. If the milk is from animal having Mastitis, it becomes thickened and akes appear. While the negative milk sample remain the same [59,60].

Bacteriological examination

For bacteriological examination milk sample collection is required. While taking sample from cow teats towards sample collection were sampled rst and then the far side ones. e rst 3 to 4 streams of milk were discarded as it may complicate the diagnosis. A er collection, the sample is subject to bacterial culture and isolation within 7 to 10 days [28].

As described by [61-63] aseptic procedures for collecting quarter milk samples were followed. e time chosen for milk sample collection was before milking. Udders and especially teats were cleaned by anti-septic's and water and dried before sample collection. Each positive CMT milk sample was collected separately to avoid confusion and cross contamination and was subject to laboratory for routine bacteriological investigation and cultured onto 10% sheep blood agar and MacConkey agar plates [62,64].

e suspected colonies could be identi ed morphologically, microscopically, biochemically and culture with ne bacterial growth were considered as positive and those with no visible growth taken as negative [65].

Direct microscopy

e milk sample was centrifuged and stained smear made from the deposit. A Gram stain was used routinely. e ZehilNeelson staining was performed for rare cases when bacteria such as *M. b.* are suspected.

Biochemical tests

For the primary isolation and identi cation of Mastitis causing microorganisms, colony size, shape, color, pigmentation, hemolytic characteristic, gram's reaction, oxidase, O-F tests were performed. A er these colonies were sub cultured to di erent media, such as Mannitol salt agar, MacConkey agar (Oxiod, Hampshire, England), Edward's medium (Oxiod Hampshire, England), Eosin methylene blue medium (EMB) (Oxiod, Hampshire, England) to get a pure culture and the secondary biochemical tests such as, coagulase test, urease test, IMVIC tests, sugar tests were done for bacterial species identi cation. e procedures for the identi ed pathogens were referred from.

Conclusion and Recommendations

Mastitis is still a major problem to farms and the review ndings suggested that Mastitis is one of important disease of dairy cattle. Subclinical form is the most prevalent type of Mastitis in Ethiopia. Stage of lactation, parity, age, breed inadequate hygienic condition of dairy environment, and milking hygiene were the most important risk factor contributing to the prevalence of Mastitis. In cow diagnosis of Clinical Mastitis is based on the appearance of abnormally appearing milk while diagnosis of Subclinical infection is more problematic since the milk appears normal but usually has an elevated somatic cell count. Diagnosis of Subclinical Mastitis can be made in a variety of ways including direct measurement of the somatic cell count (SCC) level or indirectly by performing a California Mastitis test (CMT) on suspected quarters. Several causative agents of Mastitis were reported in Ethiopia. *S. a. S. a. E. c.* were observed to be the major causes of Mastitis.

Having the above conclusions, the following recommendations are forwarded:

- Regular screening for early detection and treatment, follow up of chronic case, and control of subclinical Mastitis are recommended to alleviate the problem.
- Adequate research has to be made to gure out the prevalence at country level and take appropriate control measures.
- e sub clinical Mastitis which is highly prevalent and economically important should gain attention. In this regard awareness should be created on the importance of this type of Mastitis to farmers.

- Poor milking,-environmental and personnel hygiene should be avoided in order to prevent cross contamination and increased chance of infection.

A detailed research regarding the prevalence and risk factors distribution of the disease should be made which enable e ective control measures.

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