ISSN: 2977-4047

Journal of Life Sciences Research and Reviews

SCIENTIFIC Research and Community

Research Article

Open Access

Prevalence of Bovine Mastitis and its Associated Risk Factor Sin and Around Bahir Dar City, North West Ethiopia

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ABSTRACT

Bovine mastitis has a substantial effect on dairy production, financial loss, and public health in addition to the health and welfare of animals. A cross-sectional study design was conducted from August 2024 to September 2024 in and around Bahir Dar Town to determine the prevalence and risk factor associated with bovinemastitis occurrence. Atotal of 311lactatingcowswereselected using simple random sampling techniques. Clinical examination and California Mastitis Test (CMT) were used for detection of clinical and subclinical mastitis respectively. Based on CMT (25. 2%). From these, 12 (3. 7%) and 67 (21. 54%) were clinical and subclinical mastitis prevalence respectively. The Overall quarter-level prevalence was 138 (11%). The prevalence of mastitis based on age were 21 (20%) in young. It is statistically significantly with other age groups. 25 (22. 7%) OR=0. 46, P (0. 37) ≥0. 05, 95%CL0. 08-2. 54 in adult and 33 (34. 4%) OR=1. 46, P (0. 64), 95%CL0. 29-7. 12 in old cows. Which has not statistically significant. However, the difference in prevalence between age was not statically significant (P>0. 05). Cows during early stage of lactation had higher mastitis prevalence 32 (32%) than middle 20 (16. 5%) and late 27 (30%) stage of lactation and the difference was statistically significant (P (0. 00) < 0. 05). Body condition also consider as other risk factor for mastitis occurrence and the prevalence was 37 (18. 5%) in good and 42 (37. 8%) in poor body condition and there were highly statistically significant (P< 0. 05). Prevalence of mastitis was30 (49. 1%) in tick infested animals and there were highly statically significant (P (0. 01) <0. 05). The prevalence of mastitis was 34 (17. 9%) in concrete and45 (28%) in muddy floor type and there was highly statistically significant (P<0. 05). Factors associated with mastitis prevalence were cleanliness (hand and udder washing before milking), farmers' awareness of mastitis, the cow's parity and lactation stage, and herd size. The present study has shown that mastitis, particularly sub-clinical type, is a widely prevalent disease of dairy cows in and around Bahir Dar city. Thus, the need for applying feasible mastitis intervention strategy with special emphasis on sub-clinical mastitis should be implemented.

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Received: October 03, 2025; **Accepted:** October 14, 2025; **Published:** October 29, 2025

Keywords: Bovine Mastitis, California Mastitis Test, Prevalence, Risk Factors

Introduction

Background and Justification

Ethiopia has the largest livestock population in Africa with an estimated cattle population of 59. 5 million, which contributes 40% of the annual agricultural output and 15% total gross domestic product. Cows represent the biggest portion of cattle population of the country, accounting 42% of the total cattle population [1]. Despite the country has a huge cattle population, its milk requirement and demand are not satisfied yet due to a multitude factors.

Mastitis is among the various factors contributing to reduced milk production [2]. Mastitis is an inflammation of the parenchyma of mammary gland. Most of the cause for mastitis is infectious agents [3]. It is characterized by physical, chemical, and bacteriological changes in milk and pathological changes in the glandular tissue that affects both the normal flow and quality of milk [4].

Despite mastitis is considered as a complex and multi factorial disease, bacterial pathogens share the greatest contributions. Based on distinct characteristics of distribution and interaction with teats and ducts, causative pathogenic microorganisms are classified as contagious and environmental pathogens. The major causes of contagious mastitis, which could be cow-associated pathogens, includes Streptococcus agalactiae and Staphylococcus aureus while, Streptococcus dysgalactiae, Streptococcus Uberis and Escherichia coli are the main causes of environmental mastitis [5].

Risk factors for mastitis can be divided into factors related to animals, and factors related to environment and management. Previous studies which evaluated risk factors from mastitis found that the key risk factors at the cow level are age, lactation stage, milk production, breed, and body condition score. Key environmental and management risk factors include humidity, temperature, season, housing systems, herd size, milking management, and management to the environment [6]. The bacteria causing mastitis are found in the tissues of the cow' sudder where they can spread from one cow to another during milking (contagious pathogens). The bacteria are also found in the surroundings, such as walls, bedding, and the floor. Based on these factors, management practices.

Especially those related to hygiene, are expected to influence the onset of mastitis in a cow herd. Large herd size increases the risk of mastitis because it increases the spread of pathogens from one cow to another during milking and the likelihood of injuries [7]. Subclinical mastitis is more common in older lactating animals

and at the end of lactation than at the beginning of lactation. The structure of the udder and teat canals changes with age and parity because of frequent milking, increasing susceptibility to infections. Furthermore, cow immunity declines with age, and continuous treatment may cause the bacteria to develop antibiotic resistance. Milk yield increases with parity, and a high milk yield is positively correlated with the prevalence of mastitis. Early lactation is characterized by immunosuppression caused by stress, increasing the cow's susceptibility to infections. Immunosuppression can also be caused by nutritional stress, which happens when lactating animals do not receive enough nutrients to meet the demand for milk production. Furthermore, purebred, and high-yielding cows are more vulnerable to mastitis infections [8].

Most estimates have shown that mastitis cow result in a 30% reduction in productivity per affected quarter and a 15% reduction in productivity per cow/lactation, making the disease one among the costliest diseases of dairy industry worldwide. In addition, the bacterial contamination of milk from affected cows may render it unsuitable for human consumption due to zoonosis, food poisoning and antibiotic residue in the milk following mastitis [4]. Integrating both field and clinic-based studies are essential to formulate an evidence based rigorous and systematic disease control and prevention strategies for any disease. Despite, the economic and public health importance of mastitis, reliable information on mastitis is important for the control and prevention of bovine mastitis in diary industry.

Objective

this study was to determine the prevalence and associated risk factors of bovine mastitis in and around Bahir Dar, North West Ethiopia.

Materials and Methods

Description of the Study Area

The study was conducted in and around Bahir Dar city from August 2024 to September 2024. Bahir Darcity is the capital of the Amhara National Regional State (ANRS). It is located at11038'N, 37010'E on the Southern side of Lake Tana where Blue Nile River starts. As of the relative location, it has a road distance of 565 km from Addis Ababa capital of Ethiopia. It is located at an altitude of 1800 m above sea level with average annual temperature and rainfall of 19. 6oc and 1419 mm, respectively. According to Bahir Dar city Livestock and fishery office, the study area has livestock population of 75, 785 Cattle 24, 254 shoat 7, 912 equine and 154, 162 poultry [9].

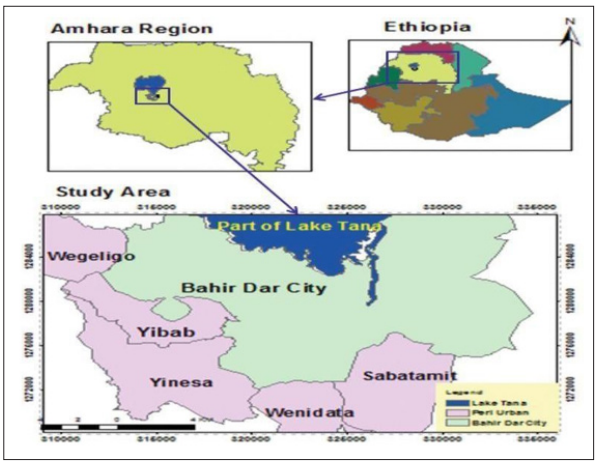

Figure 1: Geographical location of the study area (by GIS software)

Study Animals

The study was conducted on dairy cows in and around Bahir Dar city. The study includes both indigenous zebu and Holstein-Zebu crossbreeds with most being crossbreeds having 50-88% crossbred ancestry.

The farms applied both intensive and extensive management systems. According to records from the Bahir Dar city administrative livestock office, there are 130 dairy farms in the area with a total of 2, 954 dairy cows, of which 1, 866 are currently lactating [10]. We have taken a sample form 60 dairy farms with a herd size of the farm was minimum of 5 maximum 20 and a total of 311 cows was sampled by a simple random technique.

The age of animals was determined by counting the number of rings in the horn and categorized as young (2–5years), adults (5to ≤8years) and old (>8year). Stage of lactation was categorized as early (1–4months), middle (>4–8months), and late (>8monthstothebeginningofdry period). Parity was also categorized as few (with≤2calves), moderate (3–5calves), and many (>5 calves) and BCS was categorized as poor (if the dairy cows are emaciated with visible ribs from distance) and good (if the dairy cows are well nourished with at least no visible ribs from distance). The floor was grouped into muddy (floor which was not well managed) and concrete (floor which is well managed). Milking hygiene practice was categorized into good (if there is a practice of washing and dry in gudder with separate towels, milking healthy and young cows first) and poor (If washing and drying of udder with a separate towel and milking with order is not practiced) and production system was also categorized in to intensive (if the farms have feed reserves sufficient for a year, operated by a hired labor and thus, cows are managed with intensive feeding and watering) and extensive (if the farms have not feed reserves for a year, operated mainly by family labor and thus, cows are allowed to graze in the field extensively [11].

Study Design

A cross-sectional study design was followed to estimate the prevalence of mastitis, and to assess its associated intrinsic and extrinsic risk factors in dairy cows in and around Bahir Dar city, North Western Ethiopia.

Sample Size Determination

The sample size was calculated based on the formula of Thrufield (2005) at 95%confidence interval, 5% absolute precision and with expected prevalence of 28. 2% [12]. A total of 311 lactating cows; 94 Zebu and 218 Holstein-Zebu crosses were sampled from 60 dairy farms with a herd size of 5-35 lactating cows.

n=1. 962Pexp (1-Pexp)

d2

Where n=required sample size

Pexp= expected prevalence d=desired absolute precision

Sampling Methods

Dairy farms were selected purposively based on their ease of accessibility, availability of lactating cows within the farm and the owners' willingness. Simple random sampling technique was applied for the selection of individual animals (lactating cows) in the farms and examined for mastitis using clinical examinations and California Mastitis Test (CMT).

Data Collection

Data was collected from farm records when available and through interviews with farm owners when records were not accessible. This information related to various cow and quarter-level factors

believed to influence the occurrence of mastitis in dairy cows. Intrinsic factors such as breed, age, body condition score (BCS), parity, and stage of lactation, as well as extrinsic factors including production system, floor type, hygienic practices, tick infestation, and history of previous clinical mastitis, were assessed to determine their association with the occurrence of mastitis.

Examination of Mastitis

Physical Examination

In this study, the lactating cow's udder and teats were clinically examined to know the abnormalities before milk sample collection. Clinical examination was undertaken according to Radostitis et al., (2007). Accordingly, each cow's udder was carefully inspected to check the symmetry of quarters followed by thorough palpation to detect possible fibrosis, inflammatory swellings, visible injury, tick infestation, atrophy of the tissue, and swelling of supramammary lymph nodes. Furthermore, viscosity and appearance of milk secretion from each mammary quarter were examined for the presence of clots, flakes, blood, and watery secretions. The presence of clots, flakes, blood, and other consistency changes were part of the indicators for clinical mastitis along with udder and teat morphological changes [11].

Preparation of Udder and Teats for Milk Sample Collection

The udder, especially the teats were cleaned and dried before milk sample collection. Dust, particles or other filth were removed by brushing the surface of the teats and udder with a dry towel. Then washed with tap water and disinfected with cotton soaked in 70% ethyl alcohol.

Milk Sample Collection

Milk sample was collected by standard milk sampling techniques from all lactating cows. To reduce contamination of the teat ends during sample collection, the near teats were sampled first followed by the far once. Procedure for collection of milk was according to Quinn et al. (2002). Milk sampling and screening were performed for each quarter. The time chosen for milk sampling was before milking after the twice streaming. The cow age, breed, parity, lactation stage, BCS, production system, floor type, milking hygienic practice, tick infestation and previous mastitis history were also collected at the time of sampling using data recording sheet.

California Mastitis Test (CMT) Screening

It used to screen cows with sub-clinical mastitis. The collected milk samples were screened by the CMT according to Michael (2011). Mastitis cases were diagnosed based on CMT results and the nature of gel formation (milk and CMT reagent), which shows the presence and severity of the infection.

According to Quinn et al (2004) from each quarter of the udder, as quirt of milk sample was dropped in each of the strip cups on the CMT paddle and an equal amount of CMT reagent was added to each cup admixed gently. The test result was interpreted based on the thickness of gel formed by CMT reagent and milk mixture and score as 0 (negative), T (trace), 1 (weak positive), 2 (distinct positive) and 3 (strong positive). Finally, quarters with CMT score of 1 or above were judged as positive for mastitis; otherwise, negative [13].

Data Management and Analysis

The Collected data were first coded and entered to Microsoft Excel spreadsheet and analyzed using Statistical Package for Social Sciences (SPSS) software. Descriptive measures like proportions and percentages were used to summarize the data.

Odd Ratio was used to determine independent and dependent variables association. Univariable logistic regression analysis was performed to show the magnitude of independent and dependent variables association. Significance level was determined at P-value (P <0. 05) with 95% confidence interval.

Results

Overall Prevalence of Mastitis

From 311 lactating cows the overall prevalence of mastitis at cow level as determined by CMT and clinical examination was 79/311 (25. 4%). Out of this, the prevalence of clinical and subclinical mastitis was determined to be 12/311 (3. 7%) and 67/311 (21. 54%) respectively. 1244 quarters were examined from those teats screened by CMT and clinical examination over all prevalence was 138/1244 (10. 2%) out of this18/1244 (1. 44%) and120/1244 (10. 2%) quarters show evidence clinical and sub clinical mastitis respectively (Figure 2.1).

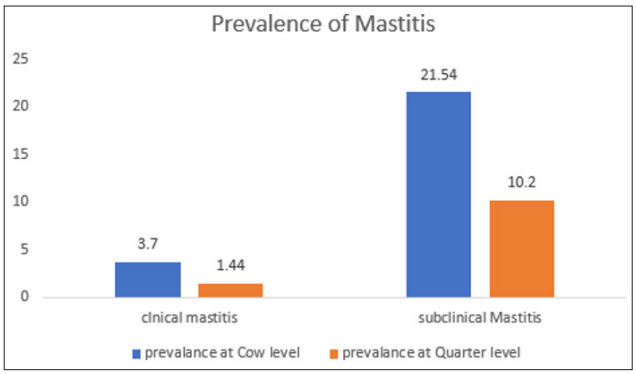

Figure 2.1: Prevalence of Clinical and Sub-Clinical Mastitis at Cow Level and Quarter Level

The prevalence of each quarter level was as follows: RF44 (14. 01%), RH28 (9%), LF32 (10. 29%), and LH 34 (10. 93%), as detailed in figure.

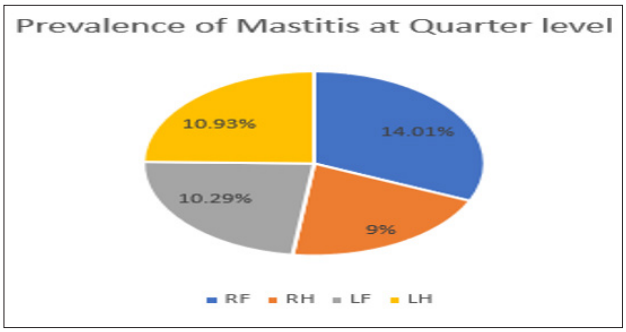

Figure 2.2: Prevalence of Mastitis at Quarter level

Occurrence of Bovine Mastitis Related to Associated Risk factors

Related to Age

Age was considering as intrinsic factor and their prevalence was 21/105 (20%) in young which has positive association (p≤0. 05) whereas 25/110 (22. 7%) in adult and 33/96 (34. 4%) in old cow has odd ratio0. 45, P (0. 37) ≥0. 05, 95%CL (0. 08-2. 54), 1. 46, P (0. 64) ≥0. 05, 95%CL (0. 29-7. 12) which has
Not statistically significant.

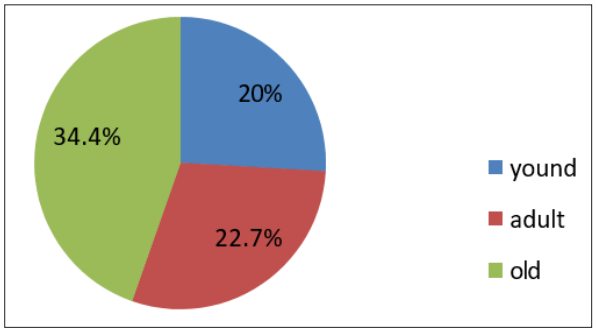

Figure 2.3: Prevalence of Mastitis by age of cow

Related to Breed

This study revealed significantly higher prevalence of mastitis 59/218 (27%) was in cross breeds as compared to local breeds 20/93 (21. 5%). However, the difference in prevalence between breed was not statically significant (OR = 0. 69, and P (0. 11) >0. 05, 95% CI 0. 64-7. 54) as the result shows in (Table 1).

Table 1: Prevalence Clinical and Subclinical Mastitis at Cow and Quarter Level

Type of mastitis	No of cows examined	No of cows with mastitis	prevalence	No quarter mastitis	prevalence
Clinical	311	12	3. 7%	18	1. 44%
Subclinical	311	67	21. 54%	120	10. 2%
Total	311	79	25. 4%	138	11%

Related to Production Systems

In comparing prevalence among production systems peak prevalence was observed in cows reared under intensive production system 59/218 (27%) than extensive production system 20/93 (21. 5%). However, the difference in prevalence between production system was not statically significant (OR=1. 12, and P (0. 93) >0. 05, 95%CI0. 08-1. 51) as the result shows (Table 2).

Related to Lactation Stage

Lactation stage was considered a risk factor for the occurrence of mastitis in this report. Cows in the early stage of lactation had a higher prevalence of mastitis 32/100 (32%) than middle20/121 (16. 5%) and late 27/90 (30%) stage of lactation and the difference was statistically significant (P< 0. 05) (Figure 2.3).

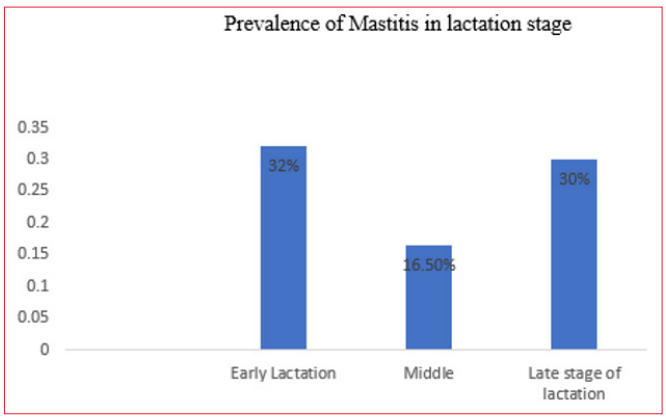

Figure 2.3: Prevalence of Mastitis in Lactation Stage

Table 2: Prevalence Clinical and Subclinical Mastitis at Cow and Quarter Level

Quarter	Number of Quarter examined	Number of affected Quarter	prevalence
RH	311	44	14. 12
RF	311	28	9%
LH	311	34	10%
LF	311	32	10. 29%
Total	1244	138	11%

RF, RH, LF and LH stands for Right Front, Right Hind, Left Front and Left Hind

Related to Body Condition

Body condition also consider as other risk factor for mastitis and the prevalence was 37 (18. 5%) in good and 42 (37. 8%) in poor body condition and there were highly statistically significant (OR=1. 20 and P (0. 01) < 0. 05), 95% CI 0. 29-4. 99) as shown (Table 3).

Table 3: Prevalence of Mastitis Milking Cows Based on Intrinsic Risk Factors
Prevalence of Mastitis Milking Cows Based on Intrinsic Risk Factors

Intersinc factor	Category	Number of examined	Number of cows with mastitis	prevalence	OR	P-value	(95% CI)
Age	Young –adult (3-6)	105	21	20%	Ref.		
	Adult (>6–10year)	110	25	22. 7%	0. 046	0. 37	0. 08- 2. 54
	Old (>10year)	96	33	34. 4%	1. 46	0. 64	0. 29- 7. 12
total		311	79	25. 4%			
Breed	Local	93	20	21. 5)	Ref.		
	Cross	218	59	27%	6. 94	0. 11	0. 64- 7. 54
total		311	79	25. 4%			
Parity	Few	101	21	20. 8%	Ref.		
	Moderate	120	27	22. 5%	5. 13	0. 27	0. 29- 9. 11
	Many	90	31	34. 44%	0. 85	0. 03	0. 13- 5. 83
total		311	79	25. 4%			
Lactation stage	Early (1–4 month)	100	32	32%	Ref.		
	Middle (>4–8month)	121	20	16. 5%	0. 01	0. 00	0. 05- 0. 66
	Late (>8month)	90	27	30%	0. 12	0. 03	0. 07- 0. 23
total		311	79	25. 4%			
Body conditions core	Good	200	37	18. 5%	Ref.		
	Poor	111	42	37. 8%	1. 20	0. 79	0. 29- 4. 99
total							

Related to Floor Type

The prevalence of the mastitis was in 34 (17. 9%) concrete and 45 (28%) muddy floor type and there was highly statistically significant (OR=0. 32, P (0. 03) <0. 05, 95%CI0. 14-0. 73) as shown (Table4. 4). There was 48 (34. 2%) in poorand31 (18. 1%) in good hygiene status and there was highly statistically significant (OR=0. 35, P (0. 01) < 0. 05, 95% CI 0. 08-1. 62) as shown (Table 4.4).

Related to Tick Infestation

Higher mastitis prevalence was recorded on tick infested dairy cow (49. 1%) than non-infested dairy cow (19. 6%) which was and there is highly statistically significant (OR=1. 10, P (0. 00) < 0. 05, 95% CI 0. 21-5. 72 as shown (Table 4).

Table 4: Prevalence of Mastitis Milking Cows Based on Intrinsic Risk Factors

Exntersinc factor	Category	Number of examined	Number of cow with mastitis	prevalence	OR	P-value	(95% CI)
Floor type	Concrete	190	34	17. 9%	Ref.		
	Muddy	121	45	28%	0. 32	0. 03	0. 14-. 73
Production System	Extensive	93	20	21. 5%	Ref.		
	Intensive	218	59	27%	1. 12	0. 93	0. 08-1. 51
Hygienic Practice	Good	171	31	18. 1%	Ref.		
	Poor	140	48	34. 2%	0. 35	0. 01	0. 08-1. 62
Tick infestation	Yes	61	30	49. 1%	Ref.		
	No	250	49	19. 6%	1. 10	0. 00	0. 21-5. 72

Discussion

This study was 1. 10 0. 00 0. 21-5. 72 s conducted to assess bovine mastitis prevalence and to identify key intrinsic and extrinsic risk factors associated with the occurrence of bovine mastitis in Bahir Dar and its surrounding areas. The finding of this study indicated an overall prevalence of 25. 4% in the study area. This result was lower than the prevalence reported by Kerros and Tareke (2003) (40%), Asmelash et al. (2017) (39. 32%) and Dego and Tareke (2003) (40. 4%) in southern Ethiopia outside of Ethiopia, such as Nigeria Danmallam F. A. and Pimenov (2019) (40. 4%), Oliveira et al. (2013) Brazil (40. 5%), Ferdous et al. (2018) Bangladesh (43. 33%), Yusuf Isleged (2022) Somalia (44. 5%) and by Rosemary Dodoman, et al (2024) (59. 8%) in Tanzania. But the result was higher than studies conducted in Sebeta Hundera et al. (2005) (16. 11%) and outside Ethiopia, such as Okoli et al (2009) Nigeria (6. 6%) Katsande et al (2013) Zimbabwe (21. 1%). This discrepancy between the current study and previous reports might be attributed to differences in management practices, cattle breeds, and agro-climatic conditions, study year and sample size which can influence mastitis prevalence.

The prevalence of clinical mastitis recorded in the present study was 3. 7% and that of subclinical mastitis was 21. 24%, which is by far higher than the occurrence of clinical cases. This finding is in line with Bitewetal. (2010), who reported clinical prevalence of 3% and subclinical cases of25. 2% at Bahir Dar and its environs. As it can be clearly seen in most published articles report (including the present finding) clinical mastitis is far lower than sub clinical mastitis [11,14-19]. This could be attributed to the little attention given to subclinical mastitis, as the infected animals show no obvious symptoms and secrets apparently normal milk and farmers especially, small holders are not well informed about invisible loss from subclinical mastitis. In Ethiopia, little attention is given to the subclinical forms of mastitis and efforts have been concentrated on the treatment of clinical cases [15,18].

Overall, the quarter-level prevalence was138 (11%) which was lower than agreed with studies Haben and Mesfin (2021), conducted on Mojo189 (49. 2%) Zeryehun and Abera, (2017) who reported41. 4% in selected districts of eastern Harrarghe Zone, Ethiopia and Gamo [20]. But the study was higher than Girma et al (2012), Seid et al (2015), and Belay et al (2022), who obtained a prevalence of 8. 03%, 6. 6%and 7. 94%, urye et al. (2023) 5. 4% from, West Hararghe, Arsi and Gamo Zone Ethiopia and Borena district of South Wollo Zone, respectively. This might be due to poor husbandry practice, use of dung smear, and suckling without washing which may create an opportunity to transfer the pathogenic agent from one quarter to the other quarter.

Crossbreed cows were more likely affected by mastitis than those of local breed cows, which were 59 (27%) OR=6. 94 P (0. 11) ≥ 0. 05, 95% CL (0. 64-7. 54) and 20 (21. 5%) respectively, which has not statistically significant. This finding agrees with 60. 2% in cross breed and 50. 8% in local breed urye etal (2023) Borena district of South Wollo Zone Sori et al. (2005), Moges et al. (2012) and Kassa et al. (2014), who have explained that genetic predisposition factors to mastitis such as teat shape, sphincter tone, anatomy of the teat canal and susceptibility to weakening of the suspensory ligament (pendulous udder). However, the discrepancy of mastitis prevalence among breeds might reflect the differences in management practice rather than a true genetic difference [4].

Higher infection in cows in early lactation stage which was32 (32%), middle lactation stage20 (16. 5%) and late lactation stage 27 (30%) respectively. This was agreed with the previous reports elsewhere in southern part of Ethiopia, early lactation stage 98 (45. 8%), middle lactation stage 104 (25. 8%) and late lactation stage 138 (38. 7%) (Biffa et al., 2005) and in Wolaita Sodo early lactation stage 62 (65. 955%), middle lactation stage4 (3. 31%) and late lactation stage37 (27. 6%) [18]. The early lactation stage infection might be due to the carryover of infection from dry period. In dairy cows, most new infections occur during the early part of the dry period and in the first two months of lactation [4].

The current finding showed significant higher prevalence of bovine mastitis was found in intensive production systems 59 (27%) when compared with extensive production systems 20 (21. 5%) which is agreed with studies conduct in Assosa, intensive production systems 67 (54. 4%) and extensive production systems 81 (33. 1%) [11]. This could be attributed to the variation in hygienic standards of dairy environment and milking conditions. In most dairy farms cows kept in intensive system maintained in a dirty and wet area, which could favor the proliferation and transmission of mastitis causing organisms. Under Ethiopian condition, dairy farmers have no experience to exercise management practices such as teat dipping, milking with gloves and milking machine.

The prevalence bovine mastitis based on parity was 20. 8%, 22. 5% and 34. 44% calving few, moderate calving and many calving respectively. This finding agreed with Awassa, Southern Ethiopia Nibret et al. (2012) 58. 5% and (22. 5%) in % calving few, moderate calving and many calving. Parity was found a significant influence on prevalence of mastitis.

The prevalence of mastitis in cows kept under poor hygiene and cows with good hygienic status was found to be 37. 8% and 18. 2% respectively. Dairy cows with poor milking hygiene standard are severely affected than those with good milking hygiene practices [17,21,22]. This might be due to absence of udder washing, milking of cows with common makers' and using of common udder cloths, which could serve as a vehicle to spread especially for contagious mastitis.

The prevalence of mastitis was higher in poor body condition as compared to good body condition which was in poor body condition 42 (37. 8%) and good body condition 37/ (18. 5%) and which was agreed with studies conducted elsewhere in Assosa town 67 (52. 3%) poor body condition and good body condition 81 (33. 8%) [23]. This may be due to the poor body condition cows lower their immunity status to fight against disease causing agent.

Higher prevalence was showed on poor hygiene practice 48 (34. 2%) in the study area. This finding was agreed with studies conducted in 22 (47. 2%) southern Ethiopia [24]. This may be due to contamination of the teat during milking by the milkers may be does not washes their hand before milk let down and the pathogen may be directly entered to the teat canal from unclean floor since the teat is open after milking.

Prevalence of mastitis was30 (49. 1%) in tick infested dairy cows which was agreed on reports that was done on Gamo32 (37. 2%) [41], Hawassa, Southern Ethiopia 28%. 3Nibret et al. (2012) and Wolayta Soddo [25]. Injuries produced by ticks are believed to create direct inflammatory reactions, necrosis, and abscess formation within the mammary gland, which can cause udder damage or risk of serious secondary infections.

Conclusion and Recommendation

The present study has shown sub-clinical mastitis was more prevalent than clinical mastitis in and around Bahir Dar city. Crossbreed cows at early stage of lactation, which had poor body condition score were at higher risk of contracting mastitis. Mastitis was found to be more common in cows with multiple parities compared to those with fewer or single parities. Additionally, cows infested with ticks had a higher incidence of mastitis than those without tick infestations. Keeping dairy cows under intensive production system in muddy floor with poor hygienic practice were also noted to favor the occurrence of mastitis significantly.

- The current study indicates the need for applying feasible mastitis intervention strategy with special emphasis on sub-clinical mastitis.
- Dairy owners should follow aseptic techniques during milking
- Dairy owners should provide adequate and balanced feed to their cow
- The health status of dairy cows should be followed regularly
- Since our study was only addressed the prevalence and associated risk factors, further detailed epidemiological, microbiological, and economic analysis studies are suggested to shape the existing control and prevention strategies bovine mastitis [26-52].

Therefore, based on the above conclusion the following recommendations were forwarded.

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