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Prevalence of Mastitis in Camel, Cattle and Goats at Benadir Region in Somalia

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Abstract

Mastitis is one of the major problems that lead economic inefficiency in dairy farm. It is categorized into clinical and subclinical mastitis and has multiple causes that are both infectious and non-infectious. Mastitis is one of the major problems and the top list of complaints from dairy farmers in Banadir region and this is ascribed as result of the inexperience of dairy farmers in Somalia who ventured camel dairy farms, cattle dairy and goat in the vicinity of the capital city of Somalia. Therefore, this study was launched to assess the prevalence of mastitis in Bandir region as well as identify the risk factors that are associated with mastitis occurrence. It was also surveyed the knowledge, practices and attitudes of farmers towards mastitis.

The study was cross sectional and took place between August 2018 to January 2019, to determine the burden or the prevalence of mastitis in the study area. The study conducted multistage sampling by first purposely selecting five districts from the 18 districts that comprises Banadir province. The area selection was based on the availability of dairy farms. Farms were also randomly selected by first listing farms in a piece of paper and selecting it from bowel, while systematic selection was conducted at animal level by selecting every three Animal for sampling and screening. Qualitative data was collected through questionnaire administered to farmers in order to gauge their knowledge, attitudes and practices on mastitis. The research used California mastitis test to screen the animals.

In this study the overall prevalence found was 23.4% and species wise the prevalence was 27.4%, 25.5% 16% for cattle, camel and goats respectively. Cattle mastitis was high compared to camel and goats. In cattle the exotic breed showed the highest (38%) prevalence for mastitis. The study found three risks factors that showed statistical significance at P<0.05 and the three risk factors include: age, parity, and lactation period at a P<0.05. it was also found out that farmers had poor knowledge, practices and attitudes on mastitis control and management. In this study KAPs analysis points out that there is overall poor practice of dairy farmers in Benaadir region. It was found out that only 16% of the respondents practice hand washing before milking, this is compounded by poor milking techniques in which tit striping is practiced by 58% of the respondents. Eighty percent (80%) of the respondents answered yes to washing the udder of the animal before milking. Where, 16% of the respondents practice post and pre milking tit dipping. These poor practices are attributed to be predisposing factors that caused mastitis. In this study it was found that the frequency of slurry and dung removal was low, 16.7% removed the slurry once a day, 33.3 of the respondents removed the slurry once a week while 50% of the respondents removed the slurry/dung once a month. This study is preliminary study and eye opener to other researchers and academician on the prevalence of mastitis, risk factors as well as KAPs of the dairy farmers on mastitis. Therefore, it is recommended that farmers follow the proper milking protocols and mastitis control guidelines as stipulated in the national mastitis council (NMC). It is also recommended that farmers are educated and given proper extension services by the relevant bodies.

Keywords: Mastitis; Camel; Cattle; Dairy

Introduction

Mastitis is an inflammation of the mammary gland and It is of two types: clinical and subclinical. Clinical mastitis (CM) is characterized by visible changes in milk (e.g., clots, color changes or consistence, and decreased production) that may be associated with inflammation signs of the udder (e.g., redness, swelling, heat, or pain) or the cow (e.g., dehydration, hyperthermia, and lethargy) [1]. Mastitis is a multi-etiological and complex disease, which is defined as inflammation of parenchyma of mammary glands. It is characterized by physical, chemical and, usually, bacteriological changes in milk, and pathological changes in glandular tissues [2]. Mastitis is a global problem as it adversely affects animal health, quality of milk and the economics of milk production, affecting every country, including developed ones and causes huge financial losses [3].

The dairy industry from a global perspective is massive and of major importance in economic growth. Today approximately over 150 million households around the globe are engaged in milk production. In East Africa, Kenya is the leading producer, producing an estimated 3.2 billion liters per year by approximately 600,000 smallholder farmers as per FAO. Recently, a remarkable increase in milk production is seen in African countries like Egypt, Ethiopia, Uganda and Namibia [4].

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Cattle are the most important group of milk producing animals in both temperate and tropical agriculture. Somalia takes the first place in the world in possessing over six million one humped camel Food and Agriculture Organization (FAO, 2004). The dromedary is an important livestock species in Somalia and plays a vital role household and in the national economy of the country [5-7].

They have also social and cultural importance to the pastoralists of the country for payment of bride-wealth, (known as "yarad" in Somali) and compensation of injured parties in tribal feuds, (known as "mag" in Somali ;) [8]. In the Somali ecosystem, camel, cattle, goats and sheep are main sources of Milk but Cattle relatively produce more milk then other species [9]. Schwartz et al., [10] recorded that the camel milk contains the necessary proteins, sugars, fats, minerals and vitamins for the young calves and is valuable food for the people. Beside that camel milk is a rich source of vitamin C for the desert people who are unable to get it from other sources. On the other hand, udder infection was considered as one of the main constraints for camel rearing. For instance, it has been noticed in the slaughter houses that early culling of female camel in Iraq is attributed to chronic mastitis and infertility [11]. During the last decades the disease has been reported from a number of camels rearing countries in Africa and Asia such as Egypt, Somalia, Sudan, Kenya, Saudi Arabia, Iraq, and United Arab Emirate. An attempt was made in this paper in order to review the status of camel mastitis (*Camelus dromedarius)* research in pastoral production system of both East Africa and Middle East. Goats are the third most important group of milk producing animals after dairy cattle and buffaloes in both temperate and tropical agriculture [9].

Their ability to adapt into different Agro-ecological zone makes the pest source of milk in different regions. They can withstand high temperatures, parasites and diseases [12]. Sub clinical mastitis remains one of the leading causes of reduced milk production in livestock. Mastitis refers to an inflammation of the mammary tissue and is a common disease in dairy cattle. This condition also possesses the risk for the transmission of zoonotic diseases like tuberculosis, brucellosis, leptospirosis and *streptococcal* sore throat to human beings [13].

Subclinical mastitis is hard to detect and treat because animals don't show any clinical signs. Sub clinical mastitis causes a 70% loss of milk production in infected animals therefore; Subclinical mastitis is a major problem affecting dairy animals all over the world. It causes enormous losses for dairy animal and consequently influences the national income of the country [14].

Economic losses are due to; loss in milk production, discarding abnormal milk and milk withheld from cows treated with antibiotics, degrading of milk quality and price due to high bacterial or somatic cell count (SCC), costs of drugs, veterinary services and increased labor costs, increased risk of subsequent mastitis, herd replacement, and problems related to antibiotics residues in milk and its products [15]. There are no written reports about the prevalence of subclinical mastitis in Somalia. Therefore, there is a need to know the prevalence of sub clinical mastitis in the livestock of Somalia. The purpose of this study was to document and determine the prevalence of subclinical mastitis in dairy herds and to establish predisposing factors that may lead to mastitis in Somalia.

Problem statement

Livestock production accounts for 60-65% of the gross domestic product (GDP). Based on (1998 FAO) estimates of livestock numbers and past growth rates, Somalia has about 6 million camels, 0.80 million head of cattle, 13.4 million goats and 11.75 million sheep in 2012. Despite the large number of animals in Somalia, there is shortage of milk and this leads extensive consumption of imported milk and discouragement to development of dairy sector in Somalia.

The shortage of milk and milk products has many causes. However, information on Mastitis which is one of the major causes of reduced milk production in dairy lactating animals in Somalia particularly Benadir region is lacking or inadequate Therefore, establishing the prevalence of mastitis in Benadir region and management practices encouraging the development of mastitis is necessary. In addition to that intensive camel dairy farms and bovine is emerging rapidly and constantly complains on mastitis in their herd.

General objectives

This study aimed to evaluate the prevalence of mastitis in dairy cows, camels and Goats in Benadir Region, Somalia.

Specific objectives

I. To determine the prevalence of mastitis in Banadir region.

II. To evaluate associated risk factors of mastitis.

III. Assess Knowledge, Attitude and Practices of dairy farmers in Banadir region.

Research questions

I. What are the causes of mastitis in lactating animals?

II. What are the risk factors associated with occurrence of mastitis?

III. What are the KAPs of farms in Banadir Region that predispose occurrence of mastitis?

Justification

The study will provide information on the extent to which mastitis is present among the dairy animals in Benadir region. This would be beneficial to both dairy farmers, other stakeholders in the dairy value chain to improve on the food security and increase households' income in line with the vision of the ministry of livestock in Somalia. This study is also important to the future researchers, civil society, local authority, community based organization, business union and NGOs that involves to the health animals and animal productions.

Research Methodology

Study area

Mogadishu or Benaadir region consists of 18 districts. It borders with middle Shebelle in the north and the east, lower Shebelle in the west and Indian Ocean in the south. The study was carried out in Five districts of Benadir region of Somalia namely, Dharkeenley, Yaqshid, Hiliwaa, Boondheere and Dayniile districts. The region lies between latitude 2°2′59″N and longitude 45°15′44″E. Although by far the smallest administrative region in Somalia, it has the largest population estimated to be about 2.3 million and covers an area approximately 96,878 km (Wikipedia, 2018). There is no information on Benaadir Animal population in particular. Therefore, these five districts were selected purposively due to their Animal population. Samples were collected randomly from the semi intensive and intensive dairy herds.

Population of the study

The target group of this study were all lactating Animals (Camel, Cattle and goats) in Benaadir Region for CMT screening. Dairy farmers were the second target group for interview about their knowledge, Attitude and Practices on mastitis.

Study design

A cross-sectional study was conducted from 1st August 2018 to 1st March 2019, to determine the burden or the prevalence of mastitis in the study area. All lactating dairy animals were examined using CMT results.

Sample size

The desired sample size for the study was calculated using the Formula given by Thrusfield with 95% confidence interval (CI) And 5% desired absolute precision and there was no previous study on prevalence of lactating animal in Benaadir region, so the expected prevalence used was 50%. Therefore,

$$n = \frac{z^2\left(\text{pexp}\left(1 - \text{p exp}\right)\right)}{d^2}$$

Where n = the required sample size

P exp= Expected prevalence of lactating animals (50%)

d=Desired absolute precision level at 95% confidence level (5%)

$$n = \frac{1.96^2(0.5)(1-0.5)}{0.05^2} = 384$$

Total Sample size was 384 of lactating dairy animals.

Sampling methods

Area selection was purposive due to the nature and reproductive systems used. Benaadir region was selected because it harbors dairy production corridors of Somalia. It is heavily invested by business and mostly practices both intensive and extensive production system. Farm selection was based on random selection by listing all dairy farms in the vicinity of Mogadishu by species of animals used as dairy then they were but, in a bowel, and selection was done randomly. Systematic selection was done at individual animal level where every third animal was selected for the sampling and screening. This systematic sampling was achieved by calculating the total number of animals from the farms through farm communication and then the interval is achieved by applying the following formula:

$$k = \frac{N}{n}$$

Where the total population *(N) is 1152 and sample size (n) is 384 therefore interval K is 3

Milk sample collection: Milk samples were directly collected from the udder of the animal at the early morning during ongoing milking process. The milk collection was conducted according to the national mastitis council (NMC, 2004). Starting from the teats furthest away from the collector, teats were cleaned with 70% alcohol and given time to dry and then, the first three streams of milk were discarded and then milk was collected directly from udder to clean CMT paddle.

Data collection instrument: Milk samples from each quarter are collected in a clean CMT Paddle. The CMT paddle has four shallow cups marked A, B, C, and D to help identify the individual quarter from which the milk was obtained. Each of the marked four shallow cups has marking lines measuring 2 mls.

California Mastitis Test (CMT): The test was conducted according to Mellenberger et al., [16] California mastitis reagent was used to screen dairy animals. From each quarter of the udder, each of milk samples measuring 2 mls was placed in each of the cups on the CMT paddle and using a syringe an equal amount of CMT reagent was added to each cup and mixed well. The test result were scored from 1-5 according to the Scandinavian scoring system, where 1 is negative result (no gel formation), 2 is traceable (possible infection) and 3 or above indicates a positive result, where 5 has the most gel formation [17].

According to the Scandinavian scoring system, the test was scored according to the agglutination and viscosity level of mixtures (reagent and milk). The interpretation was in such a way that CMT score: 1 negative (no gel formation), score 2 is traceable gel formation (possible infection) and 3 (visible gel formation) 4 and 5 has the most gel formation. Apart from 1 where there was no gel formation the rest 2 to 5 were considered positive, thus forming five categorical classes.

Observation: In the field observation was used to evaluate the hygiene of individual animal, herd level milkers and farm level as well as equipment level. Milking techniques used by the milkers, the milking time were observed. After a through observation how animals are milked and what hygienic protocols, they observe to validate the questionnaires administered to farmers.

Questionnaires: A questionnaire survey was conducted among Animal keepers to assess the knowledge-attitudepractice (KAP) among these herders and farmers towards mastitis. The questionnaire was administered to all farmers whose farms were included in the study population. The information gathered relates to their knowledge, practices and attitude to mastitis and it is management in addition to their knowledge on mastitis and its control.

Statistical analysis: The recorded data were entered office micro soft excel sheet and transferred to SPSS version 20.0 for analysis. The overall prevalence of mastitis was determined by using cross tabulation. Risk factor associated with the occurrence of mastitis like age, parity, lactation period, and species, was used to find if they were associated with occurrence of mastitis using Chi square model (X^2) at $P<0.05$, since that data was mainly nominal X^2 was the best model to find association of the risk factors.

Reliability

Reliability is trustworthiness of a measuring instrument; it is the degree to which the instrument consistently measures whatever it is meant to be measuring. The researchers conducted a pilot study before the final collection of data. Data collection tools were pilot tested in order to ascertain their ability to solicit the relevant responses to support the study. The justification for establishing the reliability of the instruments is determined by the consistency, relevancy and clarity of the instruments.

Validity

Validity is the ability to produce findings that are in agreement with theoretical or conceptual values; in other words, to produce accurate

results and to measure what is supposed to be measured (Amin, 2005). There are different ways of testing the validity of a result, as going back to the respondents and see if they agree or support the result. This is called face validity and could happen in personal conversations or in groups. In this study the researchers used that way of testing the validity of the result.

Ethical issues

Under this, the respondents were informed that participation were voluntary so that they make informed decision to participate or not. The researchers also going with an introductory letter protecting respondents through data confidentiality also minimized links between answers and identifiers, to avoid putting respondents in trouble. In addition, the researcher avoided racial or tribal remarks, which were not gender sensitive.

Results and Discussion

Prevalence of mastitis

Overall prevalence of mastitis: In the study a total of 384 lactating Animals were tested for mastitis. Out of which 90 tested positive and makes the overall prevalence 23.4%. The Table 1 above shows 90 (23.4%) were positive for CMT screening. According to Species the prevalence of mastitis are as follows: Camel 25.5% Goats 16%, and cattle 27.4% (Figure 1). The prevalence was higher in Cattle. According to Breed there was difference in the prevalence of mastitis, with 19 of the 50 Exotic cattle (38%) were found positive, and 4 out of the Local Cattle 34 (11.7%) were found positive. The prevalence was higher in Exotic Cattle and it varied significantly (P<0.03) with the lactation number Table 2.

Risk factors

As it is depicted in the above Table 3, age, parity and lactation are associated with mastitis and assumed to be risk factors with a statistically significant at p<0.5 and X^2 is 45.742, 73.214 and 57.212 respectively. The Table 4 shows the results for risk factor analysis, and it is found that age, parity and lactation, Breed are statistically significant at P<0.05 and of 30.532, 34.252, and 43.208, 9.893 respectively. The Table 5 shows the risk factors that can be associated with camel mastitis. It is evident that age, parity, lactation stages are statistically significant

Total	Positive	%	Negative	%
384	90	23.4	294	76.6

Table 1: Overall prevalence of mastitis in selected dairy farms in Mogadishu.

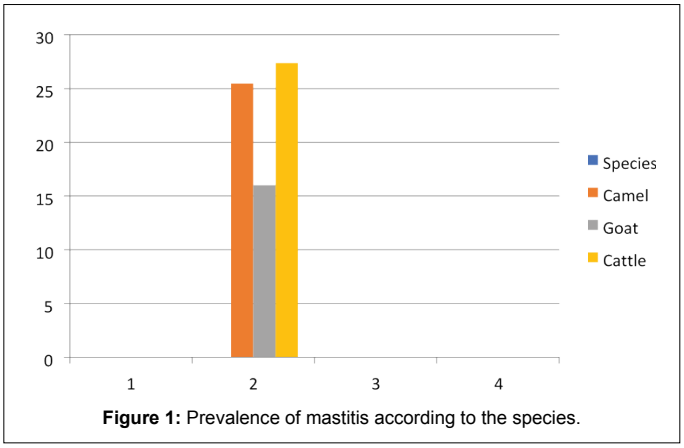

Figure 1: Prevalence of mastitis according to the species.

Breed	No. examined	No. positive	%	No. Negative	%	Chi^2	p-value
Exotic cattle	50	19	38	31	62	8.806	0.03
Local cattle	34	4	11.7	30	88.3		

Table 2: Prevalence of mastitis according to different cattle breeds.

Risk factors	Category	Number of animals examined	Number positive	X^2	P-Value
Age	Young (1-3) years	84	5	45.742	
	Old (>4 years)	16	11		0
Parity	Few Calves <3	85	3	73.214	
	Many calves >4	15	13		0
Lactation stage	Early months <2	64	0	57.212	
	Late months >2	36	16		0

Table 3: Goat risk factors analysis.

Risk factors	Category	Number of animals examined	Number positive	X^2	P-Value
Age	(2-4) years	21	2	30.532	0
	(5-7) years)	45	8		
	>7 years	18	13		
Parity	1-4 Calves	48	5	34.252	0
	5-9 calves	32	14		
	>9 calves	4	4		
Lactation stage	Early 1-3 months	41	1	43.208	0
	Middle 36 months	19	8		
	Late >7 month	19	14		
Breed	Exotic	50	20	9.893	0.001
	Local	34	3		

Table 4: Cattle risk factors analysis.

Risk factors	Category	Number of animals examined	Number positive	X^2	P-Value
Age	(2-4) years	21	2	30.532	0
	(5-7) years)	45	8		
	>7 years	18	13		
Parity	1-4 Calves	48	5	34.252	0
	5-9 calves	32	14		
	>9 calves	4	4		
Lactation stage	Early 1-3 months	41	1	43.208	0
	Middle 36months	19	8		
	Late month >7	19	14		
Breed	Exotic	50	20	9.893	0.001
	Local	34	3		

Table 5: Camel risk factors analysis.

at p<0.5 and X^2 61.680, 46.078, and 80.920 respectively. The table also shows that there is no statistical significance in species at a p value of 0.117 and a X^2 of 4.285.

Questionnaire analysis: The study conducted survey to measure the knowledge, attitude and practices of dairy farmers in Benaadir region. Twelve questionnaires were filled from the farmers that were screened for mastitis.

Practices

According to the above Table 6, the Scrap hand with disinfectants, Cut nails short, Tit squeezing, Tit stripping, Wash hands with soap, Wash the udder with clean water, Post milking tit dipping and pre milking tit dipping percentages are 16.67%, 100.00%, 41.67%, 58.33%,

25.00%, 8.33%, 16.67%, 16.67% respectively. This shows overall poor milking practices breach of the standard Mastitis control protocols. According to Table 7, some of the respondents remove the slurry or Dung once a day 16.67%, 33.33%removed once a week while 50.00%, removed once a month respectively. In this case the it is clear that the general hygiene of the dairy farmers in Benaadir region is poor.

Knowledge

According to the Table 8 above, observing the clinical signs, Use CM, Intramuscular injection, Use Intramammary tubes, percentages are 83.33%, 75.00%, 25.00%, 83.33% and 25.00% respectively. These shows the farmers have enough knowledge of mastitis it is signs and treatments, but they lack the preventive part of mastitis control

Attitude

According to the Table 9 above, calling a vet and Treat by myself, vets not important and important percentage of 16.67%, 75.00%, 75% and 16.67% respectively. In this table most of the farmers do not call a vet to treat and give advice on mastitis control, this shows how farmers don't have faith on veterinarians. According to the Table 10 above the farmers use antibiotics for mastitis treatment Ox tetracycline being the most used antibiotics (83.33%) and Pen strep, is the least antibiotic used (16.67%). According to the Table 11, the antibiotic treated milk and use of milk treated with antibiotics, impact of antibiotic are: 25.00%, 75%, and 75% respectively. This shows the general attitude of farmers to antibiotic and mastitis milk is poor and need awareness creation and education to improve their attitude.

Practices	Frequency	Percent	Cum Percent	Exact 95% LCL	Exact 95% UCL
Scrap hand with disinfectants	2	16.67%	16.67%	2.09%	48.41%
Cut nails short	12	100.00%	100.00%	73.54%	100.00%
Tit squeezing	5	41.67%	41.67%	15.17%	72.33%
Tit stripping	7	58.33%	58.33%	27.67%	84.83%
Wash hands with soap	3	25.00%	25.00%	5.49%	57.19%
Wash the udder with clean water	1	8.33%	8.33%	0.21%	38.48%
Post milking tit dipping	2	16.67%	16.67%	2.09%	48.41%
pre milking tit dipping	2	16.67%	16.67%	2.09%	48.41%

Table 6: Farm practices for mastitis.

How frequent do you remove the slurry or the dung	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
Once a day	2	16.67%	16.67%	2.09%	48.41%
Once a week	4	33.33%	50.00%	9.92%	65.11%
Once a Month	6	50.00%	100.00%	21.09%	78.91%

Table 7: Frequent of slurry or dung removal.

Variables	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
Do you know mastitis	10	83.33%	83.33%	51.59%	97.91%
Understand mastitis clinical signs	9	75.00%	75.00%	42.81%	94.51%
Diagnose (Use CMT)	3	25.00%	25.00%	5.49%	57.19%
Use of antibiotics (Intramuscular injection)	10	83.33%	83.33%	51.59%	97.91%
Use intramammary tubes	3	25.00%	25.00%	5.49%	57.19%

Table 8: Knowledge for mastitis.

Variables	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
Call a vet	2	16.67%	16.67%	2.09%	48.41%
Treat by my self	9	75.00%	75.00%	42.81%	94.51%
Vets no important	9	75%	75%	42.81	94.51%
Vets important	2	16.67%	16.67%	2.09%	48.41%

Table 9: Attitude for mastitis.

Which of the above-mentioned antibiotics best works for you	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
Ox tetracycline	10	83.33%	83.33%	51.59%	97.91%
Pen strep	2	16.67%	100.00%	2.09%	48.41%
Total	12	100.00%	100.00%	--	--

Table 10: Type and use of antibiotics.

After treatment what do you do with the milk	Frequency	Percent	Cum. Percent	Exact 95% LCL	Exact 95% UCL
Give the calves	3	25.00%	25.00%	5.49%	57.19%
Sell to the public	9	75.00%	100.00%	42.81%	94.51%
Have impact on human	3	25.00%	25.00%	5.49%	57.19%
No impact on human (antibiotic milk)	9	75%	100%	42.81	94.51%
Total	12	100.00%	100.00%	--	--

Table 11: After treatment what do you do with the milk?

Discussion

In this study the overall prevalence found was 23.4% and species wise the prevalence was 27.4%, 25.5% and 16% for cattle, camel and goats respectively. Cattle mastitis was high compared to camel and goats. In cattle the exotic breed showed the highest (38%) prevalence for mastitis. The same has been reported by Tedela [18] who reported prevalence of exotic cattle breeds as 39.8%. The difference could be associated with the intrinsic factors such as breed of animals examined, genetic resistance to mastitis and extrinsic factors such as production systems [18]. Camel mastitis prevalence in this study was 25.5%, this in agreement with research conducted in Somali region of Ethiopia which reported prevalence of camel mastitis as 25.3% [19].

In another research conducted in Kenya reported prevalence of goat as 30.3%, this study is contrary to what was found goats in Mogadishu which was 16%. the difference could arise from the different Grazing system and breeds of the two study subjects, the goats studied in this paper are semi intensive whereby they get exposed to environmental causes of mastitis less than intensive system. The farms studied by laban adopted intensive farming system and the breed are of the diary type. There are other researches that showed similar or close prevalence that was conducted in Ethiopia [20] reported prevalence 18.0%, 15.5% respectively.

Risk factors

There was association found between parity, age and lactation period at a $P<0.05$. This is in line with reports by Laban in Kenya who reported that the third and fourth parities were more susceptible to succumb to mastitis than first and second parities in dairy animals. It was also found that stage of lactation period was statistically significant at $P>0.05$, this agrees with Laban, Mbilu and Moreno who reported that late gestation period was significantly associated with occurrence of mastitis due to prolonged exposure to unhygienic environment and lack of dry therapy.

In this study KAPs analysis points out that there is overall poor practice of dairy farmers in Benaadir region. It was found out that only 16% of the respondents practice hand washing before milking, this is compounded by poor milking techniques in which tit striping is practiced by 58% of the respondents. Eighty percent of the respondents answered yes to washing the udder of the animal before milking. Where, 16% of the respondents practice post and pre milking tit dipping. This is similar to what was reported in Tanzania by kivaria [21] who sated that only 10% practiced squeezed milking techniques. While Laban, stated that 24% practice squeezing milking technique, this poor milking techniques cause's damage to endothelial lining of the teat hence makes the tit prone to colonization by infection. Sharma et al., [22] also stated that 98% practiced hand washing and disinfection, udder washing before milking and none treated their goats with antibiotics, this is contrary to what was found in this paper and it could be attributed due to the lack of awareness on good milking practices and, extension services to dairy farmers. These poor practices are attributed to be predisposing factors that caused mastitis.

In this study it was found that the frequency of slurry and dung removal was low, 16.7% removed the slurry once a day, 33.3 of the respondents removed the slurry once a week while 50% of the respondents removed the slurry/dung once a month. These shows poor hygiene in the farm, as stated by Sudhan and Sharma [23] moisture, mad and manure in the environment of the animal are the primary causes of mastitis in dairy farms [24-86].

Conclusion and Recommendations

This study collected both qualitative and quantitative data and it was found out that the overall prevalence of mastitis 23.4% and is a major health problem of dairy Animals and will have an adverse effect on productivity of dairy industry and hence need serious attention. The study also revealed that there are general poor hygiene, poor practices and attitudes to dairy farmers. There was strong association between mastitis and risk factors as stipulated to be age, lactation period and parity. The risk factors could be exaggerated by the poor practices and attitudes of the farms. It is clear that, due to the farmers neglecting the ability of the veterinarian and livestock professionals to help alleviate the production impacting mastitis, mastitis prevalence is high. Therefore, there is need of the farmers to trust livestock professional and veterinarians.

This study recommends the following measures in order to control and prevent mastitis in large or small farms:-

Dairy farmers should improve hygiene during milking by;

- Proper washing of hands before milking and between animals.
- Only using clean water and separate towels for cleaning the udders.
- Implementing the use of teat-dip after milking.
- Keeping animals from lying down immediately after milking.
- Milking order where you milk non mastitis Animals first and Animals or quarters with mastitis infections last should be adhered to.
- Farmers should be advised to keep record in order to gain statistics on health status of dairy animals in herds.
- There is need to create awareness on Animal mastitis among Animal keepers. At the moment there is low level of awareness among pastoralists.
- Daily and periodic removal of manure from the Animals houses should be a routine exercise and should be accompanied by cleaning of the environment surrounding the dairy farms.
- California Mastitis Test and somatic cell count should be done at least once a Month for monitoring udder health status of dairy animals.
- Further studies are needed to determine complete microbiological analysis of dairy animals and sensitivity test of these pathogens.
- Farmers should be educated on the effect of mastitis on animal production and how to control it.

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