

Major management and health problems of calves in dairy farms in and around Mekelle - Principales problemas de salud y manejo en terneros de lecherías en los alrededores de Mekelle

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Resumen

Se realizó un estudio en el período comprendido de noviembre 2011 a abril de 2012 con el objetivo de evaluar el manejo y los problemas de salud en 54 lecherías en los alrededores de Mekelle. El estudio reveló que 29 lecherías (53.7%) se localizaban en el área urbana y 25(42.3%) el área periurbana. En general el sistema de manejo resultó intensivo en un 48(88.88%) mientras que 6(11.11) era semi-intensivo. La información sobre los factores de riesgo potenciales se estudio a través de encuestas durante el período de estudio. Se constató que el 46.29% de las lecherías estaban afectadas de fiebre aftosa y el 25% de los terneros. Con diarrea, el 25.92% de los terneros. En las lecherías afectadas el 11.32% de los terneros, con problemas respiratorio el 11.11% de las lecherías, afectados el 7.56% de los terneros, infestadas de ixódidos el 11.11% las lecherías, afectando el 4.72% de los terneros y con absceso un 5.55% en las lecherías afectando el 1.41% de los terneros. Entre los factores de riesgo considerados para el análisis, se consideró el sistema de manejo, la toma de calostro, ventilación y la atención del ternero para ser asociado significativamente con los problemas de salud de éstos ($P < 0.05$). La salud y manejo de los terneros de reemplazo componentes importantes para la rentabilidad de manada de total.

Palabras claves: Terneros; lecherías; salud; manejo; factores de riesgos

Abstract

A Cross-sectional study was conducted from November 2011 to April 2012 to assess calf management and health problems in 54 dairy farms in and around Mekelle. The study revealed that 29 (53.7%) farms were located in the urban and 25(42.3%) were found in peri urban. In general the farming system was intensive in 48(88.88%) farms while 6(11.11) were semi-intensive. Information on potential risk factors was collected using questionnaire survey conducted during the study period. It was replied by the respondents that, Foot and Mouth disease was found in 46.29% dairy farms affecting 25% calves, calf diarrhea in 25.92% dairy farms affecting 11.32% calves, respiratory problem in 11.11% dairy farms affecting 7.56% calves, tick infestation in 11.11% dairy farms affecting 4.72% calves and local abscess in 5.55% dairy farms affecting 1.41% calves. Among the risk factors considered for analysis, farming system, age at first colostrum feeding, ventilation and calf treatment were found to be significantly associated with health problems of calves($P < 0.05$). The health and management of replacement calves were found to be important components for total herd profitability.

Key words: Calf; dairy farms; health; management; risk factors

1. INTRODUCTION

Livestock production consists one of the principal means of achieving improved living standards in many regions of developing world. In sub Saharan African countries, livestock plays a crucial role both for the national economics and the livelihood of rural communities (ILCA, 1998).

Ethiopia has the largest livestock in Africa and ranks 10th in the world. The country's agro-climate is suitable for livestock production. Moreover, livestock is the source of protein, fuel and animal products and by products in general. Currently a number of urban and peri-urban dairy farms are major suppliers of milk and milk products to the consumers (Tegegne and Gebrewold, 1998).

In Ethiopia dairy cattle are maintained under different production systems, management and milking conditions, and there is also little knowledge about the science of dairying among the farmers. The intensification of dairy

production, especially under hot and humid condition, presents new disease problems (ILCA, 1994; Shiferaw *et al.*, 2003).

Several factors affect the health and vigor of the calves immediately after birth (Sivula *et al.*, 1996). Proper nutrition is fundamental for calf growth and for the general profitability of calf rearing enterprise. In young stock, a good nutritional strategy optimizes rumen development and growth while minimizing stress and disease. Livestock housing conditions greatly affects health and productivity (Gitau *et al.*, 1994; Wudu *et al.*, 2008). Cleanliness of the barn influences calf health, as calves housed in unclean barns are at higher risk of diseases than calves housed in clean barns (Wudu *et al.*, 2008).

Passive immunity can be achieved through ingestion of an adequate volume of colostrum feds for calves (Molla, 1978; Adams *et al.*, 1985; Besser *et al.*, 1991). Leaving the calf with the cow for nursing is not recommended because these calves may not receive adequate passive transfer of immunity (Besser *et al.*, 1991; Brignole and Stott, 1980).

The poor immune system and lack of previous exposure to infection make new born calves susceptible to infectious diseases and poor management (Stoltenow and Vincent, 2003; Darsema, 2008). They should get colostrum soon (before 2-4 hours) after birth. The impacts of calve diseases could be direct (causing calf deaths) and indirect through increased treatment expenses and decreased life time productivity and survivorship (Waltner-Toews *et al.*, 1986). Other environmental and managemental risk factors known to affect calf health and survival include level of herd production, practice prophylactic antibiotics, weaning age, separation or mixing of the calves (Brunning and Kanene, 1992; Olsson *et al.*, 1993).

Calf hood diseases have a major impact on the economic viability of cattle operations, due to the direct costs of calf losses and treatment and the long term effects on performance (Donovan *et al.*, 1998). Diarrhea is one of the most important constraints in food animal production (Lema *et al.*, 2001). Its prevalence appears to be management related especially when calves are housed in unhygienic conditions (Wudu *et al.*, 2008).

It is important to realize that the costs of poor calf management go beyond just calf mortality losses. For example, failure of passive transfer of immunity in calves not only results in increased mortality early in life (Wells *et al.*, 1996), but also has long term effects on calves' lives. Failure of passive transfer in heifer calves is linked with decreased rate and efficiency of growth and decreased first and second lactation milk production (Faber, 2005). Management practices including calving management, colostrums administration, nutrition, and vaccination can impact the overall health and

productivity of the dairy herd. With the above background, the objectives of the present study were:

- To identifies the major management and health problems of calves in dairy farms in and around Mekelle, Ethiopia.
- To assesses the level of farmer's awareness on good calf management practices.

2. MATERIALS AND METHODS

2.1. Study Area

The study was conducted from November 2011 to April 2012 in and around Mekelle which is found in northern part of Ethiopia. The region extends from 12° 13` to 14 ° 54` north latitude and from 36° 27` to 40° 18` longitude with a total area of approximately 102,000 square kilo meters. The exact location of Mekelle city is 39° 29` east and 13° 30` north of equator at an altitude of 2,070meters above sea level. The mean annual rainfall ranges from 11.3millimeter to 39.1millimeter and the temperature varies from 12° c (in November and December) to 27°c (in January and March). Mekelle enjoys a mild climate (MCP, 2007).

2.2. Study Population

A total of 54 dairy farms were selected randomly from 108 farms which were registered in agriculture office. The study animals in the current study were calves.

2.3. Study design

A cross-sectional study was conducted. The farms were selected by simple random technique.

2.4. Data Collection

A total of 54 dairy farm owners and / or attendants were interviewed using structured and open ended questionnaires. The format was filled directly by face to face interviewing to collect farm characteristics, calf management technique including feeding, housing and previous history of calf disease etc.

2.5. Data management and Analysis

The data from questionnaire studies were entered to Excel spread sheet and descriptive statistics was employed to summarize the data and analyzed using SPSS version (15) statistical software.

3. RESULTS

3.1. Questionnaire Survey Analysis

Based on the questionnaire study, it was found that male entrepreneurs cover majority of the dairy farm operations. Out of the 54 respondents, 49 (90.74%) were males and 5 (9.26%) were females. As observed from the educational level of farm owners or attendants, 16 (29.63%) were illiterate, and the rest 38 (70.37%) were literate.

With regard to the location of the farms, 29(53.7%) were found in the urban location and 25(46.3%) were in peri- urban. 48 (88.89%) farms were managed intensively while 6(11.11%) were semi intensive.

3.2. Calf Management

From a total of 54 dairy farms 212 calves were surveyed, 194 (91.5%) were females and 18 (8.5%) were males. Out of the 212 calves, 5(2.36%) were assisted delivery while 207 (97.64%) were delivered normally. Dairy farms owners and /or attendants responded that they practice colostrum feeding of their new born calves 12 (22.22%) by leaving new born calves with their dam, while 42 (77.78%) dairy farms practiced hand feeding for their new born calves. From total of 54 dairy farms colostrums feeding of calves before 6 hours were practiced in 51 (94.44%) farms and after 6 hours 3(5.56%) farms. The amount of milk fed daily in the farms was: 14 (25.93%) <4liter, 35(64.81%) ≥ 4liter, 5(9.26%) the amount of suckled milk is unknown. All dairy farms fed their calves twice daily and most dairy farm respondents provide their calves' additional feeds. Respondents wean their calves at different stage of calves age, 4 (7.4 %) of the respondents wean their calves at the age of less than 3 months, while 50 (92.6%) weans after 3 months. Caves were housed separately away from adult animals on 24(44.44%) of the farms and in the same barn with cows in 30(55.56%). The daily frequency of cleaning of the house showed that, 18(33.33%) once, 25(46.3%) twice, 6(11.11%) three times and 5(9.26%)> three times (Table -1).

Table 1: Management factors in 54 dairy farms given in a questionnaire survey

Factor	Category	Frequency	Percent (%)
Sex of calves	Male	18	8.5
	Female	194	91.5
Amount of milk fed daily	<4 liter	14	25.93
	≥ 4liter	35	64.81
	Unknown	5	9.26
Method of milk feeding	Calf sucking	5	9.2
	Hand feeding	49	90.7
Weaning age	<3 month	4	7.4
	≥3month	50	92.59
Age at first colostrum feeding	≤6hrs	51	94.44
	>6hrs	3	5.56
Cleaning frequency of the house	Once	18	33.33
	Twice	25	46.3
	Three times	6	11.11
	>3 times	5	9.26

3.3. Health condition

Health problems were higher in male calves 14(77.77%) as compared to female calves 91(47.42%) (Table-2).

As the respondents replied Foot and Mouth disease was common in 25(46.29%) dairy farms affecting 53(25%) calves; calf diarrhea in 14(25.92%) dairy farms affecting 24(11.32%) calves, respiratory problem in 6(11.11%) dairy farms affecting 16(7.56%) calves, tick infestation in 6(11.11%) dairy farms affecting 10(4.72%) calves and local abscess in 3(5.55%) dairy farms affecting 3(1.41%) calves (Table-3). It was reported that 20 calves died by FMD and 5 calves diarrhea.

Table 2: Sex wise distributions of health problems

Factor	Total no. of calves	No. of affected calves	Percent (%)
Male	18	14	77.77
Female	194	92	47.42

Table 3: Major disease problems in dairy farms in and around Mekelle.

Disease problems	Local name of disease	Frequency		Percent (%)	
		Farms n=54	No. calves n=212	Farms n=54	No. calves n=212
FMD	Afo-Mear	25	53	46.29	25.00
Calf diarrhea	Tekmat	14	24	25.92	11.32
Respiratory problem	Sael	6	16	11.11	7.56
Tick infestation	Kurdid	6	10	11.11	4.72
Local abscess	Hibet	3	3	5.55	1.41

Health problems in the farms with regard to farming system were assessed. The result showed that 4(66.67%) semi intensive and 32 (66.67%) intensive farms were found to have health problems in calves. In semi-intensive

farms, FMD 4(66.67%), Calf diarrhea 4(66.67%), tick infestation 3(50%), and local abscess 2(33.33%) were the major problems. Whereas the figure in intensive farms showed, FMD 21(43.75%), Calf diarrhea 10(20.83%), respiratory problem 6(12.5%) tick infestation 3(6.25%) and Local abscess 1(20.83%) (Table-4).

Table 4: Health problems of dairy calves based on farming system

Disease problems	Farming system (n=54)	
	Intensive (n=48)	Semi-Intensive(n=6)
FMD	21(43.75%)	4(66.67%)
Calf diarrhea	10(20.83%)	4(66.67%)
Respiratory problem	6(12.5%)	0%
Tick infestation	3(6.25%)	3(50%)
Local abscess	1(20.83%)	2(33.33%)

3.4. Association of risk factors with health problems of calves

Among the risk factors considered for analysis, farming system, age at first colostrums feeding, ventilation and calf treatment were found to be significantly associated with health problems of calves ($P < 0.05$).

Table 5: Association of risk factors with health problems based on questionnaire survey.

Risk factor	Health problem	P-value
Farming system	Tick infestation	0.001
	Local abscess	0.002
Age at fist colostrums feeding	Calve diarrhea	0.03
Ventilation	Respiratory problem	000
Calf treatment	Tick	0.01

4. DISCUSSION

The study revealed that the majority of the respondents were male and they were mostly involved in the enterprises. A total of 54 dairy farms and 212 calves were included in the present study. In 2.36% of the calves the delivery was assisted while 97.64% were delivered normally. This finding somehow agrees with the findings of Odoch (2001) who reported non-assisted delivery of 82 %. From 54 dairy farms 94.4% fed colostrum to their calves before six hours of birth. In the present finding those calves which fed colostrum after six hours of birth were found to be at higher risk to disease than those fed before 6 hours of birth. This might be due to the fact that calves fed colostrum before six hours of birth develop initial immune protection against infectious diseases (Wittan and Preino 1995; Waver *et al.* (2000).

Hand feeding was practiced in most of dairy farms and by sucking from dam was practiced in few dairy farms. Milking was performed twice daily, morning and evening and the calves were allowed to suck for 20-30 minutes. The amount of milk available to the calf was, therefore, determined by the quantity of milk remaining after milking. About 25.93% of the calves included in the study obtained less than four liters of milk daily. Many respondents relied on the sale of milk to provide income and consumption, and calves could, therefore, be easily starved since residual milk may be inadequate to meet the requirements of the calves. However, residual calf suckling have the advantage of reducing contamination, the feeding of cold milk to the calf and incidence of mastitis in the dam Mdegela *et al.* (2004).

In the present study, 55.6% of the farms kept their calves in the same barn with cows. In such housing system, incidence of diseases is higher than those raised in individual calf pen. This agrees with the findings of Lema *et al.* (2001) and Wudu *et al.* (2008).

Health problems were higher in male calves (77.77%) than female calves (47.42%). This could be due to the less attention and management care given to the male calves as their role in the farms was considered not profitable in this study. Male calves have less absorption ability of serum immunoglobulin's than female calves and they could become more immune deficient than female calves as described by Khan and Zaman (1991).

Foot and Mouth disease was affecting calves 25%. This could be due to presence outbreak of Foot and Mouth disease in the study period.

The prevalence of calf diarrhea, 11.32%, in the present study is less than previous studies (Darsema, 2008; Bekele *et al.*, 2009) with 13.5% and 34%, respectively. The difference can be caused by many factors including

variation in ingestion of colostrums, hygienic condition of feeding utensils and condition of housing.

Respiratory problem was reported with prevalence of 7.57% which is less than the prevalence reported by Wale (2011) 10.6%. This slight variation might be due to environmental factors, ventilation of the house and immunity development. The prevalence of local abscess in the present study, 1.41%, agrees with reports of Britney *et al.* (1984) and Olsson *et al.* (1993).

In the present study 50% of the semi intensive farms were infested by tick. This disagrees with the report of Ykealo (2008) who reported 12%. The difference could be attributed to the difference in the ectoparasite sprays used and degree of exposure.

In brief the present investigation revealed that management problems in the dairy farms assessed was found seriously affecting the productivity of dairy farms through decreasing the availability of replacement stock. Among the potential risk factors investigated, farming system, age at first colostrum feeding, ventilation and calf treatment were significantly associated with calve health problems. The high risk of health problems could be associated with the outbreak of the disease and the poor housing and management systems. The same finding was also reflected by Shiferaw *et al.* (2002) who reported the effect of microenvironment on the health of calves.

5. CONCLUSION AND RECOMMENDATIONS

The health and management of calves are important components of total herd profitability. The calf health and management problems found in the present study can be addressed through good management practice. Age at the first colostrum feeding, housing condition and sex were the most important determinant of calf health problems. The present study also showed that foot and mouth disease was predominant calf health problem and followed calf diarrhea and respiratory problem and others like tick and local abscess.

Based on the above conclusion the following recommendations are forwarded:

- Special emphasis should be given to the time of colostrum feeding and the hygienic condition of calves house
- Implementation of improved calf management practice to reduce the high level of calf disease problems.

- Vaccination of cows against the common calf pathogens and rearing calves in a clean and separate calf pens under good nutrition should be practiced.
- Creation of awareness among farm owner on the major causes of calf health problems and their respective preventive measures could be of great importance to maximize productivity and farm income.

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