Full Length Research Paper

Assessment of major reproductive health problems of dairy cattle in small scale dairy farm and associated risk factors

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ABSTRACT

A cross sectional study design was carried out from August to December, 2017 at selected small scale dairy farms, Sebeta-Hawas Town, Addis Ababa Special Zone, Ethiopia. The aims of this survey were to determine major dairy cattle reproductive health problems and assess associated risk factors of dairy cattle in the study areas. Purposive sampling technique was used to select study dairy farms and participants. Semi-structured questionnaire was employed to collect the data. The collected data were analyzed by using Statistical Package for Social Science (SPSS) version 21. In this survey, 55 study respondents indicated that mastitis (56.4%) and hypocalcaemia (21.8%) were the major dairy reproductive health problems of dairy cattle followed by brucellosis (12.7%), tick infestation (5.45%) and abortion (3.64%) in the study farms. Among assessed risk factors, management system was found to be associated with the occurrence of the problems and there was statistical significant difference (p<0.001). However; there was no statistical significant difference between the occurrence of the health problems and body condition score (p>0.05).The study concluded that there were major dairy cattle reproductive health problems in the study farms. Therefore; awareness creation of the community and giving attention to the sector should be considered in order to design effective prevention and Control Strategies in the areas.

Keywords: *Dairy Cattle, health Problems, Small Scale Farms, Sebeta-Hawas Town*

INTRODUCTION

Ethiopia is reported to be endowed with the largest livestock population in Africa. The country is believed to have the largest livestock population in Africa comprising approximately 56.7 million cattle, 29.3 million sheep and 29.1 goats. Livestock sector in the country provides drought power, incoming to farming communities, means of investment and important source of foreign exchange earning to the nation. On the basis of statistics acquired from different sources, livestock provides 16% of the total GDP (equivalent to 30% of agricultural GDP) and generates 14% of the country's foreign exchange earnings (CSA, 2014).

Generally speaking, dairy cattle health can be expressed as the level of clinical and subclinical disorders on a farm or in a region. Both will affect productivity in terms of growth, milk yield, meat and economic value. Diseases and health are components of an economic function (McInerney, 2002). Disease causes loss of production and product loss set aside the additional costs for extra labor, veterinary intervention, and product withdrawal time. In developing countries dairy production and cattle diseases are moreover related to geographical conditions, politics and socio-economic issues (Makuze and Wollny, 2005).

Consumers who ultimately pay for the product (costs), will at the same time value such products (public image) and (in case of overt disease) revalue the products. Especially in developed countries this function plays a paramount role in dairy production, not in the least because consumers have become very critical about animal production methods and husbandry, as well as the use of vaccines and medicines over the last decades. In developing countries, the prospects of cattle production largely depend on the extent limitations are prevailing in the area of geography, politics, infrastructure, culture, and socio-economic (Zwart *et al.,* 1998; Woods, 2001).

Vaccination may be a desired intervention in yet another region (e.g. Africa) but financial and political limitations may lead to a non-consistent and non-sustainable strategy. Therapy may be sophisticated in one region, for example based on both microbiological culturing in well-equipped ISO-certified laboratories and on antibiotic sensitivity testing, it may be poor in other regions due to lacking equipment, scientific support and knowledge or strongly prevalent ethno-veterinary principles. One of the greatest drawbacks on perception of impact of subclinical disease on small-holder farms is the lack of knowledge among farmers (Lobago *et al.,* 2006).

Monitoring of health refers to a practical methodology to routinely, rapidly, cheaply and effectively gather sufficiently reliable information about certain issues in both dairy cattle and their direct environment. The ultimate goal is to interpret monitoring findings properly and make inferences about the question whether there are (pending or prevalent) health problems in the herd. This will subsequently be the basis to design a plan of actions for the shorter and the longer term (Jutzi and Abate, 1987).

Within each country, region within country and on each farm a selection has to be made what to do, why, when, how often and how. This selection must be based on the chosen goals. Such selection will depend on the disease(s) of concern, priorities of the farmer, the feasibility on the farm, and the relevance given the health situation on that farm. Health monitoring as indicated above is valid in every situation on every farm, when it is properly executed according to the forenamed guidelines (Makuze and Wollny, 2005).

In addition to cattle health it has appeared economically worthwhile to consider elements of cow comfort as prerequisites for optimal health. Cow comfort comprises four main components: feed and feeding-associated issues, barn and barn climate, housing and specific cattle behavior (Noakes *et al.,* 2001). The components refer to basic measurements and requirements of cattle with regard to their biological needs (Bracke *et al.,* 2001). For assessing cow comfort different scoring or monitoring parameters can be defined in addition to measuring the various elements of housing, climate and feeding. These parameters can be considered as potential risk factors which might hamper health, reproduction, production and welfare, and are, hence, closely related to the issues addressed above. The interaction between floor design and maintenance on the one hand and locomotion and lameness of cattle on the other hand, shows that cow comfort issues and cattle health are very closely related (Somers *et al.,* 2003).

The livestock plays an important role in providing export commodities, such as meat, live animals, hides and skins to earn foreign exchange to the country in addition to local consumption for rural communities. However, this great potential is not properly exploited because of endemic infectious and non-infectious disease burdens, drought, poor veterinary service and traditional management system, inferior genetic makeup coupled with malnutrition and absence of well-developed market infrastructure (MOA, 2005; MOI, 2005). Small-holders appear to be largely unaware of the pathogenic processes of disease. This will hamper efficient and effective disease eradication, control and prevention programs in the field. The most substantial elements for these farms are in teaching and training, rather than in obtaining, say, antibiotics for treating disease (antibiotics which may not be first veterinary choice fir that given disease anyway). When attention is given to this disease state, it appears that farmers more easily adopt control strategies (Kivaria *et al.,* 2004).

Even though the farm owners are complaining about dairy cattle reproductive health problems, there is no well-organized document information on major dairy cattle reproductive health problems at selected small scale dairy farms, Sebeta-Hawas Town, Finfine Special Zone, Ethiopia (DLAO, 2016). Therefore the objectives of the study were: -
- ➢ To determine and identify major dairy cattle reproductive health problems in the study farms.
- ➢ To assess potential risk factors for major dairy cattle reproductive health problems in the study farms.

MATERIALS AND METHODS

Description of the study area

The study was conducted from August to December, 2017 in and around Sebeta-Hawas town, Finfine Special Zone, Ethiopia. The town is found about 13 kms from north of Addis Ababa. It is located at an elevation of 2,088 m above sea level. The annual minimum and maximum temperature is 15°C and 27°C and the annual average rainfall is 1800 mm (NAMSA, 2016).

The population of the zone of Oromia as per the 2007 census (CSA, 2014) was about 1.4 million. It comprises two districts, rural and urban including Sebeta-Hawas Urban Administration Center. Farming is the main livelihood strategy of the study area in which seasonal rainfall pattern determined the production activity. Many of the population depend on subsistence farming as the livelihood strategy. The rural and peri-urban areas of the zone are featured by mixed agricultural system where livestock plays an important role (CSA, 2014). The total livestock population is estimated as 119650 cattle, 33250 sheep, 17295 goats, 2290 horses, 380 mules, 14650 donkeys, 72270 chicken and 1915 bee hives (WAO, 2010).

Study participants

Fifty (50) volunteer farm owners and five (5) animal health practitioners who lived for more than six months in the areas having variety of age, education status and income per month, and also, dairy cows with different breed, age, management systems(i.e. intensive and semi-intensive), body condition(based on) and kebeles were included in the study during the study period. The age of study animal grouped into two (6 months to 3 years(young) and greater than 3 years(adult) based on owners information and dentition rule as by De Lahunta and Habel, 1989. Body condition score (BCS) of the animals characterized based on Nicholson and Butterwoth (1986) principles, then categorized in to three poor 0-3, medium 4-6 and good is above 6).

Sampling procedure

About 55 voluntary study participants were purposively selected by considering the proximity to road, number of dairy farms and all animal health practitioners who were found in the selected study areas.

Data collection methods

The collected data were collected by using semi-

structured questionnaire, observation of the herds and management practices.

Questionnaire survey

A structured questionnaire was used to interview the selected study participants. It was focus mainly on these problems that hinder dairy cow production and productivity in study area

Observational (Monitoring) study

Regular observation of selected small scale dairy farm from two management systems (i.e. intensive and semi-intensive) was conducted to assess the major dairy cattle reproductive health problems and associated risk factors (i.e. Kebeles, breed, age and body condition) were monitored in the study area during the study period. Regular follow up of the cows was performed once per two weeks and the result was recorded in follow up data collection sheet.

Data Management and Analysis

The data collected were entered into Microsoft 2007 excels software's and analyzed by using Statistical Package for Social Science (SPSS) version 20. Descriptive statistics was used to describe the major health problem of dairy cattle. P-value <0.05 was set as the significant level and 95% confidence interval (CI).

RESULTS

Socio-demographic Characteristics of Sampled Households

A total of 55study respondents were interviewed for the assessments of major dairy cattle health problem in the study areas. The majority of respondents were male (83.6%) and the minimum and maximum age was 18 and 60 years, respectively. Regarding educational status, (85.5%) of the study respondents were illiterate. Most of the respondents were married who have an average income of less than 34US dollar in month (52.7%) (Table 1).

Major dairy cattle reproductive health problems

In this study, the study respondents complained that mastitis (56.4%) and hypocalcaemia (21.8%) were the major dairy reproductive health problems of dairy cattle

Table 1. Socio-demographic Characteristics of the Study Participants

Variable	No of respondents	Category	Frequency	Percent (%)
Sex	55	Male	46	83.6
		Female	9	16.4
		Total	55	100
Age	55	18-25	4	7.30
		25-39	11	20.0
		39-54	31	56.4
		>54	9	16.3
		Total	55	100
Educational Status	55	Illiterate	47	85.5
		Literate	8	14.5
		Total	55	100
Income per month	55	<34 US$	29	52.7
		38-102 US$	17	30.9
		>136 US$	9	16.4
		Total	55	100

Table 2. Major Dairy Reproductive Health Problems and Their Risk Factors

Variable	NO	Category	Frequency	Percent (%)
Common Reproductive Diseases	55	Mastitis	31	56.4
		Hypocalcaemia	12	21.8
		Brucellosis	7	12.7
		Tick Infestation	3	5.45
		Abortion	2	3.64
Total			55	100
Breed	55	Local	7	12.7
		Cross	33	60.0
		Exotic	15	27.3
Total			55	100
Body Condition Score	55	Good	19	34.5
		Medium	13	23.7
		Poor	23	41.8
Total			55	100
Management System	55	Intensive	21	38.2
		Semi-intensive	34	61.8
Total			55	100

followed by brucellosis (12.7%), tick infestation (5.45%) and abortion (3.64%) in the study farms. It was also indicated that cross breed (60.0%) were more affected. Most of the respondents had showed that semi-intensively managed dairy cattle were affected by the health problems (61.8%) (Table2).

Dairy cattle health services

In this study, the respondents depicted that scarcity of private veterinary services (14.5%), provide quality services which hinder the improvement dairy cattle problems. But, most of householders call to government veterinary health professions to provide treatment (85.5%). Moreover, most of the respondents use modern drugs (81.8%) and some of them used traditional medicine (18.2%) to treat their sicken animals (Table 3).

Associated risk factors

In this study, management system was found to be associated with the occurrence of dairy cattle reproductive health problems and there was statistical significant difference ($p<0.001$) in the study area. However; there was no statistical significant difference between the occurrence of the health problems and body condition score ($p>0.05$) (Table 4).

Table 3. Dairy Cattle Reproductive Health Services given in the Study Areas.

Variable	No of respondents	Vet. Clinic Category	Frequency	Percent (%)
Organization that treats animals	55	Government	47	85.5
		Private	8	14.5
		Total	55	100
Treatments given	55	Modern Drug	45	81.8
		Traditional Medicine	10	18.2
		Total	55	100
Time to bring sick animal for treatment	55	Early	23	41.8
		Later	32	58.2
		Total	55	100

Table 4. Associated Risk Factors in the Study Area

Variable		Common Dairy Cattle Reproductive Health Problems					X^2	P-value
		Mastitis	Hypocalcaemia	Tick Infestation	Brucellosis	Abortion		
Body Condition Score	Good	3	0	0	0	0		
	Medium	5	1	3	1	0	0.685	0.06
	Poor	13	7	0	0	0		
Management System	Intensive	1	2	0	1	0	3.94	0.001
	Semi-intensive	9	3	2	5	2		

DISCUSSION

According to present study the social demographical status of respondents indicated most of them were male with age category between 39-54years and educationally illiterate with low monthly income. This finding is in line with the finding of Bahlibi (2015) in central zone of Tigray. The respondents indicated there was scarcity of government veterinary clinic and use private veterinary services (14.5%) which is very expensive to provide treatment services which hinder the improvement dairy cattle problems. Whereas, some of the respondents use traditional medicine (18.2%) to treat their sicken animals. Using of traditional medicine may cause death of animal since its dose is not clearly identified and other hygienic problems.

The current study revealed that mastitis, hypocalcaemia, brucellosis, tick infestation and abortion were found to be the major dairy cattle reproductive health problems in fifty five dairy cattle farms in Sebeta-Hawas farms, containing(56.4%), (21.8%), (12.7%), (5.45%) and (3.64%), respectively. The finding of the study was in line with the finding of Fasil et al. (2016) in Hawassa town. The current study indicated that the prevalence rate of mastitis (56.4%) which was higher than the result of Fasil et al. (2016) who reported (20.4%) in Hawassa town and Sileshi et al. (2016) who reported (30%) in and Around Wukro, Tigray Region, Ethiopia. This might be due to dairy cattle management and location differences. According to the study respondents, Hypocalcaemia (21.8%) was found to be the second major health problem in the study dairy cattle farms. This result was slightly higher than the findings of Fasil et al. (2016) who reported 17.5% in Hawassa town and Mamo (2004) in Bishoftu area.

The current study indicated that brucellosis (12.7%) was the third dairy cattle reproductive health problem in study farms. The result was in line other findings that were done in different dairy farms in Hawassa town (20.4%) by Fasil et al.(2016) and in and Around Wukro (30%) done by Sileshi et al. (2016). Tick infestation was also found to be another dairy cattle health challenges

in the study farms. The result was in agreement with findings of Tesfahiwet (2004) in Adea Liben Woreda of Borena Zone of Ethiopia. However, the prevalence rate of Tick infestation (5.45%) recorded in this survey was lower than the report (54.5%) of dairy farms that were done by Sileshi *et al.* (2016) in and Around Wukro, Ethiopia.

In this study, abortion (3.64%) was found to be the major dairy cattle reproductive health problem in the study area. The result was lower than the finding (7.14%) of Sileshi *et al.* (2016) in Wukro, Tigray region of Ethiopia and the finding (6.0%) of Ayisheshim et al., (2017) in and Around Gondar Town, Northwest Ethiopia. But, this result was slightly higher than Befekadu (2007), 1.5% in DebreZeit, Tadelech, (2004), 2.91% in Borena zone of southern Ethiopia and lower than Merck and Co (1998)., 20.2% in central Ethiopia. This prevalence difference of abortion in dairy cows may be due to differences in environmental conditions and different reproductive diseases like brucellosis, Trichomoniasis, Campylobacteriosis, Leptospirosis and Salmonellosis (Getachew and Nibret, 2014). This might be due to the difference in management system. Among the assessed associated risk factors, management system was found to be statistically significant difference with the occurrence of the problems ($p<0.05$). This is in line with other findings (Mamo, 2004).

CONCLUSION AND RECOMMENDATIONS

Reproductive health problems are one of the bottle necks of dairy industry. The current study revealed that, mastitis hypocalcaemia, brucellosis, tick infestation and abortion were found to be the major dairy cattle reproductive health problems in the study farms. These problems are the leading causes for mortality, production loses, reduce growth rate and reduce reproductive ability of dairy cattle. Management system was found to be statistically significant difference with the occurrence of the problems ($p<0.05$).Therefore based on the above conclusion the following recommendations were forwarded:-
➢ Proper management practices should be alleviated and improved in the study farms.
➢ Moreover; awareness should be created at farmers' level on the reproductive health problems and control strategies.
➢ Both governmental and non-governmental organization should give attention to dairy farm problem to alleviate problems of the sector.

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