Survey of Major Diseases Affecting Dairy Cattle in Jimma Town, Oromia, Ethiopia

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Abstract: The aim of the survey was to assess major diseases and access to veterinary service delivery of smallholder dairy cattle under intensive production system in Jimma town, Ethiopia. A single-visit-multiple-subject formal survey technique was used to collect data from 54 small-scale dairy farming households which were selected at random and were interviewed using pre-tested, structured questionnaire. It appeared from the study that mastitis (35.2%), internal parasites (14.8%), lumpy skin disease (13%) and heart water (5.6%) were identified as the most frequently occurring diseases. Results of the survey of major dairy cattle disease in the study area ranked mastitis as number one disease of dairy animals. Average mortality of calves, heifers, lactating cows and dry cows over 12 months was 0.82 ± 1.00, 0.27 ± 0.60, 0.64 ± 1.06 and 0.13 ± 0.40, respectively. It was observed that loss of calves (16%), heifers (5.6%) and lactating cows (16.7%) were due to lumpy skin disease, followed by heart water affecting 5.6, 3.7 and 1.9% of calves, heifers and lactating cows, respectively. Most of the respondents (90.7%) did not practice traditional ethno-veterinary treatment, whereas 9.3% of the farmers used traditional treatment practices and the remaining 13% respondents used a combination of veterinary services and traditional ethno-veterinary methods to treat their animals. It was suggested that proper animal management, cleanliness and good hygiene on dairy farms and practices of mastitis control measures such as udder disinfection and dry-cow therapy and adequate veterinary services would help to alleviate cattle health constraint in the study area.

Key words: Heart water % Lumpy skin diseases % Mastitis % Parasite % Tick

INTRODUCTION

In Ethiopia, agriculture accounts for 47% of GDP and to more than 80% of export earnings and the sector employs overt 85% of the population [1]. IFPRI [2] indicated that the livestock sector contributes an estimated 16% to the total GDP and over 40% to the agricultural GDP. In Ethiopia, livestock represents a major national resource and form an integral part of the agricultural production system. The country has the largest livestock population of any African country with estimated as 43.1 million heads of cattle and cows represent the largest proportion of indigenous cattle of the country [3]. Milk produced from these animals provides an important source of family nutrition for the majority of rural as well as urban and peri-urban population. Despite the largest cattle population, productive and reproductive performance is very low. This is attributed to the poor genetic potential. Feed shortage, high disease incidence and poor management

condition [4]. Climatic condition, poor nutritional status and low level of management contribute to a high incidence of cattle diseases, especially in the crossbred cattle. In Ethiopia, the aggregate annual economic losses from animal diseases through direct mortality and reduced productive and reproductive performance were estimated at US$ 150 million [5]. Many of the diseases in Ethiopia are still uncontrolled and are causing devastating effects both to the producers and to the national economy [6].

Recently, small-scale urban dairy farming using crossbreed cattle is emerging as an important business enterprise in Jimma town. However, milk production from crossbred cattle often does not satisfy the increasing demand of milk due to different constraints of which disease is one of the major factors. However, there is little information relating to types of cattle diseases encountered by the small-scale dairy farmers in the study area. Identifying cattle health constraints is important to design appropriate strategies that would help reduce disease prevalence and effects on sustainable milk

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production. The aim of this study was, therefore, to assess common cattle diseases affecting small-scale improved dairy cattle production in Jimma town.

MATERIALS AND METHODS

Study Area: The study was conducted in Jmma town of Oromia Regional State, south-western Ethiopia. The study area, Jimma city is located at 355km south-western of Addis Ababa. The area lies between a latitude of 7°41'N and longitude of 36°50'E and has an elevation of 1704 meters above sea level. The area is characterized by a humid tropical climate of heavy annual rainfall that ranges from 1200-2000 mm per year. About 70% of the total annual rainfall is received during rainy season, which lasts from the end of May to early September. The mean annual maximum and minimum temperature ranges from 25°C-30°C and 7°C-12°C [7].

Sampling Procedure: Dairy farmers were selected using systematic random sampling technique. A total of 54 dairy farm owners were randomly selected from 72 small-scale dairy farmers registered at Jimma town Bureau of Urban Agriculture Development.

Data Collection and Analytical Technique: A single-visit-multi-subject formal survey technique [8] was used to collect data. The selected respondents were interviewed using pre-tested, structured questionnaire. The questionnaire was developed in accordance with the objectives of the study and designed in a simple manner to get accurate information from the dairy farm owners. The questionnaire was mainly based on socio-economic household characteristics, the major cattle diseases, cattle mortality and access to veterinary services. Clinical symptoms perceived by the respondents were used for identification of a particular cattle disease. The data was subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) software, version 16.0 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics such as means, frequency distribution and percentages were used.

RESULTS AND DISCUSSION

Animal Management: Cows are managed under zero-grazing system in back-yard operation utilizing whatever space was available in the residential compound. Cows are managed in closed houses with different types of floor structure throughout the day. The feed on which the animals are fed include cut natural pasture, hay, milling by-products, commercial and on farm formulated concentrate and unconventional feeds. Cows are hand milked with twice per day milking frequency. Animals are watered from pipe. Natural mating is the only breeding system used for inseminating cows. There was no regular vaccination and spray/dipping, but farmers took their animals for treatment when ever diseases occurred.

Household Characteristics: Major household characteristics of the respondents are shown in Table 1. Results of the analysis on Table 1 show that the average age and family size of the respondents was 51.26±10.99 years and 6.02± 2.52 members/household, respectively. The table also shows that 24.1, 35.5 and 7.4% of the farmers had secondary school, college and university education, respectively which shows that majority of the farmers in the study area were educated. The majority of the respondents (75.9%) were male, whereas 24.1% are female showing that dairying in Jimma town is mainly male domain. It was observed that 96.3% of the respondents owned no land, whereas 3.7% leased out a small area of land. In terms of occupation 25.9% were civil servant, 25.9 % were retired, 20.4% are traders, 11.1% are household wives and 16.7% are full-time dairy farmers. Thus, for most of the respondents dairying is only taken as a side business. Dairy farming experience of the respondents ranged from less than 5 years (16.7%) to more than 15 years (50%).

Major Diseases Identified: Diseases pose a major threat to dairy cattle production in the study area (Table 2). According to the respondents perception, mastitis (35.2%), internal parasites (14.8%), lumpy skin disease (LSD) (13%) and heart water (5.6%) were identified as the major diseases affecting dairy cattle in the study area. Mastitis was reported to be the most severe disease of high prevalence in the studied farms resulting in decreased milk yield, premature culling of cows, milk discard and high treatment. A high incidence of lumpy skin disease was also observed in calves and dairy cows during this study period (Figure 1). The poor hygiene of cows' shelter, shortage of space and absence of mastitis control measures such as udder disinfection and dry-cow therapy, as well as low level of management were observed as the major reasons for the high prevalence of mastitis. The high incidence of mastitis observed in the present study is in agreement with findings of Kedija *et al.* [9] who reported mastitis prevalence of 45.8% in indigenous cattle. Mastitis is an economically important disease in milking cows as it causes financial loss as a

Table 1: Socio-economic characteristics of the respondents in the study area

Variables	N	Mean±SD
Age	54	51.26±10.99
Family size	54	6.02± 2.52
Level of education (%)		
Non educated	1	1.9
Primary school	11	20.4
Junior Secondary school	6	11.1
Senior secondary school	13	24.1
College	19	35.2
University	4	7.4
Landholding (%)		
Landless	52	96.3
Leased	2	3.7
Occupation (%)		
Business	11	20.4
Civil worker	14	25.9
Retired	14	25.9
Dairy farmer	9	16.7
Housewife	6	11.1
Major sources of income (%)		
Dairying	40	74.1
Salary	2	3.7
Business	11	20.3
Pension	1	1.9

N=number of respondents

Table 2: Frequencies of major disease of dairy cattle according to the respondents' perception in the studied farms

Disease type	Frequency	Percent
Mastitis	19	35.2
Tick Infestation	8	14.5
Lumpy skin diseases	7	13.0
Heart water	3	5.6
Internal parasite and mastitis	4	7.4
External and internal parasites	2	3.7
Lumpy skin diseases and mastitis	4	7.4
External parasite and heart water	1	1.9
Lumpy skin diseases and heart water	1	1.9
Mastitis and heart water	3	5.6
Mastitis and external parasite	1	1.9
Mastitis and heart water	1	1.9

Fig. 1: A crossbred calf affected by lumpy skin disease during data collection. Photo by: author

result of decreased milk yield [10]. Mungube *et al.* [11] estimated the economic losses from mastitis in the urban and peri-urban areas of Addis Ababa (Ethiopia) to be US $ 58 per cow per lactation. Tick infestation was reported as the second most important disease. According to Radostits *et al.* [12] ticks are known to be vectors of economically important diseases such as anplasmosis, babesiasis and cowdriosis. About 5.6% of the respondents indicated the prevalence of heart water associated with high tick infestation. Tick born diseases are the most important problems in introducing exotic animals in to Africa [13]. It was observed that farmers in the study area had no vaccination for the important contagious diseases on regular basis but treat their animals when ever the diseases occurred. The respondents said that diseases are impacting dairy production in many ways such as reduced body weight, reduced growth rate, low milk production and reproductive performance, mortality and high treatment cost.

Mortality: As indicated in Table 3, the overall mortality of calves, heifers, lactating and dry cows over the last 12 months was 0.82 ± 1.00, 0.27 ± 0.60, 0.64 ± 1.06 and 0.13 ± 0.40, respectively. It was found that more calves died than the other groups of dairy cattle. This might be due to poor management practices of calves and their increased susceptibility to diseases and environmental stresses than older animals. This is in agreement with findings of Gebre-egziabiher *et al.* [14] who reported that with an increase in age, mortality decreased probably because of improved adaptation of animals to both climatic and nutritional factors.

As shown in Table 4, the respondents reported that mortality due to lumpy skin disease (LSD) and heart water was identified as the major causes of loss of cattle in the study area. It was observed that loss of calves (16%), heifers (5.6%) and lactating cows (16.7%) were due to LSD, followed by heart water affecting 5.6, 3.7 and 1.9% of calves, heifers and lactating cows, respectively. The lowest cause of cattle loss was due to internal parasites, which is most probably due to intensive management system of the animals.

Access to Veterinary Health Services and Use of Ethno-Veterinary Treatments: About 13, 37, 24.1 and 25.9% of the respondent get animal health services through Ministry of Agriculture (MoA), part-time veterinarians (PV), Jimma College of Agriculture and Veterinary Medicine (JCAVM) and both part-time veterinarian and JCAVM, respectively. The majority of the

Table 3: Average mortality of dairy cattle during 2009 based on households' response in the study area

Variable	N	Mean±SD	Minimum	Maximum
Calves	50	0.82±1.00	0	4
Heifers	49	0.27±0.60	0	3
lactating cows	50	0.64±1.06	0	4
Dry cows	47	0.13±0.40	0	2

N= number of respondents

Table 4: Major reasons of mortality of dairy cattle in the study area as perceived by the respondents

Variables	Frequency	Percent
Reason for calf mortality		
Lumpy skin disease	9	16.7
Calf scour and pneumonia	2	3.7
Heart water	3	5.6
Parasite	1	1.9
Dystocia	1	1.9
Unknown	9	16.7
Reason for heifer mortality		
Lumpy skin disease	3	5.6
Heart water	2	3.7
Unknown	4	7.4
Reason for mortality of lactating cows		
Lumpy skin disease	9	16.7
Heart water	1	1.9
Milk fever	3	5.6
Unknown	4	7.4
Reason for mortality of dry cows		
Heart water	2	3.7
Unknown	2	3.7

Table 5: Access to veterinary service and methods for treating sick animals

Parameter	Frequency	Percent
Use of ethno-veterinary		
Yes	5	9.3
No	49	90.7
Use of traditional and modern veterinary		
Yes	7	13.0
No	47	87.0
Access to veterinary services		
Ministry of Agriculture	7	13.0
Part-time veterinary professional	20	37.0
JCAVM + part-time veterinarian	14	25.9
JCAVM	13	24.1

farmers (37%) used part-time veterinarian who visits farms when every health problem is noticed. Most of the respondents (90.7%) did not practice traditional ethno-veterinary methods to treat sick animals, whereas 9.3% of the farmers practiced traditional treatments to treat sick animals. Few (13%) of the respondents indicated that a combination of modern veterinary service as well as traditional treatments were used for treatment of animals.

CONCLUSION

It appeared from the study that mastitis, tick infestation, lumpy skin disease and heart water were the major diseases affecting dairy cattle production in the study area. It could be suggested that problem of mastitis would be alleviated through proper animal management, cleanliness and good hygiene on dairy farms and practices of mastitis control measures such as udder disinfection and dry-cow therapy. The outbreak of lumpy skin disease could be controlled through improving veterinary services with respect to adequate vaccination; and heart water (seasonal tick infestation) and internal parasites would be alleviated by spraying and de-worming.

REFERENCES

1. Bureau of African Affairs, 2006. http://www.state.gov/r/pa/bgn/2859.htm.
2. IFPRI, CSA and EDRI, 2006. Atlas of the Ethiopian Rural Economy. International Food Policy Research Institute (Washington, DC), Central Statistical Agency (Addis Ababa), Ethiopian Development Research Institute (Addis Ababa).
3. CSA (Central Statistical Authority), 2008. Statistical Abstract 2007. CSA, Addis Ababa, Ethiopia.
4. Mukasa-Mugerwa, E., E. Bekele and T. Tessema, 1989. Type and productivity of Indigenous cattle in central Ethiopia. Trop. Anim. Hlth. Prod., 21: 120-120.
5. Berhanu Admasu, 2002. Welcome address: Animal health and poverty reduction strategies. In: proceedings of the 16th Annual Conference of the Ethiopian Veterinary Association (EVA), held 5-6 June, 2002, Ghion Hotel, Addis Ababa, Ethiopia, pp: 117-137.
6. EARO (Ethiopian Agricultural Research Organization), 1996. Animal Health Research program strategy (draft document). Addis Ababa, Ethiopia.
7. OPEDJZ (Office of Planning and Economic Development for Jimma Zone), 2002. Statistical Abstract. Jimma, Oromia, Ethiopia.

8. ILCA (International Livestock Center for Africa), 1990. Livestock systems research manual. No. 12, section 1. Working document. ILCA. Addis Ababa, Ethiopia.

9. Kedija Husein, Azage Tegegne, Mohammad Yousuf Kurtu and Berhanu Gebremedhin, 2008. Traditional cow and camel milk production and marketing in agro-pastoral and mixed crop-livestock systems: The case of Mieso District, Oromia Regional State, Ethiopia. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Workshop Paper 13. ILRI (International Livestock Research Insititute), Nairobi, Kenya, pp: 56.

10. Morse, D., M.A. DeLorenzo, R.P. Natizke and D.R. Bray, 1998. Characterization of clinical mastitis records from one herd in subtropical environment. J. Dairy Sci., 71: 1396-1405.

11. Mungube, E.O., B.A. Tenhagen, F. Regassa, M.N. Kyule, Y. Shiferaw, T. Kassa and M.P.O. Baumann, 2005. Reduced Milk Production in Udder Quarters with Subclinical Mastitis and Associated Economic Losses in Crossbred Dairy Cows in Ethiopia. J. Tropical Animal Health and Production, 37: 1573-7438.

12. Radostits, O.M., D.C. Blood and C.C. Gray, 1994. Veterinary Medicine: A text book of the diseases of cattle, sheep, pigs, goats nd horses, 8th ed., Baillier, Tindall, London, England.

13. Girma, T. and K.J. Sumption, 2000. Preliminary studies on viability of cowdria ruminantum stored in growth media and solution media Hanks balanced salt solution under different temperatures. Proceedings of the 8th Conference of Ethiopian Society of Animal Production (ESAP). Addis Ababa, Ethiopia, pp: 320-327.

14. Gebre-egziabiher Gebre-Yohannes, Mulugeta Kebede and Tesfaye Kumsa, 1991. Mortality rate of ¾ crossbred animals in the Bako area. In: Proceeding of the 4th national livestock improvement conference, held at Institute of Agricultural Research (IAR), 13-15 November 1991. IAR, Addis Ababa, Ethiopia, pp: 96-102.