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Major Health Challenges of Dairy Cattle in and Around Wukro, Ethiopia

[1]Astaws Sileshi, [2]Alebachew Tilahun, [1]Eskeziaw Benalfew and [3]Abebaw Getachew

[1]Bench Maji Zone Livestok and Fishery Department, Ethiopia
[2]Wolaita Sodo University, School of Veterinary Medicine, Ethiopia
[3]Agarfa Federal Agricultural Teaching Vocational and Educational Training College, Ethiopia

Abstract: A survey was conducted with the aim of assessing major health challenges of dairy cattle in and around Wukro town, Eastern zone of Tigray, Ethiopia from November, 2009 to April, 2010. Questionnaire and retrospective survey were employed to obtain the required primary and secondary data, respectively. Ninety respondents were included in the questionnaire survey. According to questionnaire survey, the identified major health challenges of dairy cattle in the study area divided as reproductive, metabolic, respiratory, parasitic and other infectious and non-infectious disease. The major diseases of dairy cattle encountered in the study area were mastitis (30%), retain fetal membrane (25.6%) and abortion (23.3%). Internal parasitism (20.0%), tick (18.9%) and mange mite (15.6%), were mentioned as major parasitic diseases while pneumonia (17.1%), was the main respiratory disease of dairy cattle. In addition, calf diarrhea (22.2%) and lameness (16.7%), were indicated as major other infectious and non infectious diseases of dairy cattle in the study area. The findings of the retrospective survey also confirmed that internal parasite (21.9%), external parasite (20.2%) and mastitis (16.7%) were identified as the major health challenges of dairy cattle in the study area. Moreover, 68.9% and 45% of the respondents explained that there were shortage of feed and water in the study area, respectively, which leads to the occurrence of diseases. Further research to identify diseases was recommended.

Key words: Dairy Cattle · Health Challenges · Questionnaire · Retrospective Survey · Wukro

INTRODUCTION

Livestock production constitutes one of the principal means of achieving improved living standards in many regions of the developing world. In sub-Saharan African countries, livestock plays a crucial role for the national economies and the livelihood of rural communities [1]. The dominant economic future of the continent is the agricultural sector of which livestock; dairying in particular, is a very important and essential component [2]. Livestock production in most African countries has been an integral part of agricultural system and cattle production is the main component of livestock production in most farming systems in sub-Sahara Africa [3].

Recent study shows that Ethiopia is lucky in that it has more than 28 million cattle. This resource is important in livestock production system. Namely; sedentary highland and pastoralist low land. In the low land area of the country, livestock is the sole mainstay of the livelihood for the entire human population; cattle are considered as leading species among the livestock for their high milk yield [4]. In contrast to the huge livestock resource, the livestock productivity, however, found to be very low. These may be due to major biological and socio-economical factors attributing to the low productivity includes the low genetic potential and performance, poor nutrition (in quality and quantitative terms), traditional way of husbandry systems and the prevailing of different disease [5].

In the country, the main agricultural output is generated from crop and livestock integrated systems. Livestock plays a crucial role in almost all agricultural products, as they constitute the major energy source, traction power in cultivation, haulage and threshing of crops. They also form a major source for cash income through live soles or soles of their direct and secondary products. Livestock also contributes to the nutrition of human society through meat and milk products which are of high quality and essential for normal growth and function of human body. The manure from livestock is

Corresponding Author: Alebachew Tilahun,Wolaita Sodo University, School of Veterinary Medicine, Ethiopia.
E-mail: alebmen19@gmail.com.

also used as fertilizer and provides household fuel energy. Although Ethiopia's livestock resource is substantial, its level of productivity is low due to the constraints of diseases, nutrition and poor management [6].

Four major systems of milk production can be distinguished in the country. Out of this intensive dairy farming system is a specialized dairy farming practiced by state sector and very few private individuals on commercial basis. Most of the intensive farms are concentrated in central highlands and are basically based on exotic pure breed stock. The modern intensive system, which comprises cooperative, state and privately owned dairy farms, uses exotic breeds and crosses. The urban, peri-urban and intensive dairy farmers produce 2% of the total milk production of the country. Accurate estimates of milk production in the intensive system are difficult to obtain as some milk from the cooperatives is sold privately, while state and private farms often do not keep proper records. Based on the field survey of some cooperative farms, milk production per cow has been estimated approximately as 1120 liters over 279 days lactation period or 4 liters per cow per day. Some study report that an output of 2500 liters (9 liters /cow per dairy) over the some lactation period on the state dairy farms [7].

Milk production often doesn't satisfy the country's requirements due to multitude factors. An important factor that influences herd productivity is the amount and type of health problems that the dairy cows experiences. The low cattle productivity in tropics is attributed to poor genetic potential, malnutrition, thermal stress, inadequate management practices (since most of cattle are located in rural areas where traditional management is highly practiced), high incidence of diseases and parasitic burden which in general cause high livestock mortality and socio-economic factors [8].

Diseases of various origins (viral, bacterial and parasites) could be mentioned as a major constraint of food animal production and productivity in various parts of the world. Therefore the efficient production of livestock that yield milk, meat and drought power is a major concern of the society [9]. Generally, the huge dairy cattle potential in the region could contribute more to the regional as well as to the national economy. Among the major problems that have a direct impact on reproductive performance of dairy cattle, retained fetal membrane (RFM) and the subsequent endometritis and pyometra have been reported to be the most common clinical and economical problems [10]. However, except in towns situated in the central high land areas of Ethiopia including the capital city, very little work has been conducted to identify the overall health problems of dairy cattle in rural areas. This wide spread challenges of dairy cattle in all agro ecological zones have hindered its developments. Therefore, the objectives of this study were to identify major health challenges of dairy cattle and to assess its predisposing factors in and around Wukro.

MATERIALS AND METHODS

Description of the Study Area: The study was conducted from November, 2009 to April, 2010 in and around Wukro town. Wukro is located in the Eastern administrative zone of Tigray at altitude of 13° 47' N and longitude of 39° 36' E. 43 km distance from Mekelle city. It is situated in the area having an elevation of 1977 m.a.s.l. with clearly defined rainy season from July to September followed by long dry season from October to June. The mean annual rainfall is 300-350mm. The mean annual temperature in the study area varies from maximum of 31°c in May and minimum of 8.3°C in July with an overall mean range from 11.1 °C-28.3°C. Animal population is shown in Table 1 below [4].

The dominant farming system in the study area is subsistence mixed crop livestock system. Smallholder farmers integrate crop and production to maximize return from their limited land capital resources and minimize production risk. Annual food crops such as respectively of cultivated land extensive as a source of household energy. Crop residues are used as feed for livestock. Output from livestock such as milk and meat are important source of food for the family. Hence livestock service of capital asset in the farm mean of saving [11].

Study Population: All dairy cattle owned by selected respondents were considered as study population accordingly, there were 448 dairy cattle sampled constituting 147 lactating cows, 70 dry cows, 65 heifers, 76 female calves, 50 male calves and 40 bulls.

Study Design: A cross-sectional survey was conducted from November, 2009 to April, 2010 to identify major health challenges of dairy cattle and to assess its predisposing factors in and around Wukro.

Study Protocol

Sampling Procedure: Purposive sampling techniques was employed to select two woredas namely kilte Awlaelo and Wukro and 6 peasant associations (Adiksandid, Aynalem and Genfel from Kilte Awlaelo and three kebele from wukro woreda namely Hayelom, Agiazi and Dedebit) based on accessibility to transport and difference in

Table 1: Animal population of the region in the study area

Species	*Tigray Region*	*Wukro woreda*	*Kilte Awlaelo woreda*
Cattle	2,668,078	2657	61376
Goats	1,759,126	245	30253
Sheep	687,212	546	21557
Horse	7,598	36	82
Donkey	403,517	226	12447
Mules	16,418	67	717
Camels	39,791	-	357
Poultry	4,999,677	1225	54217
Beehives	228,684		
Total	10810101	5002	181006

Source: CSA [4]

geographical location. Moreover, simple random sampling technique was used to select households for questionnaire survey. Fifteen dairy cattle owners were selected from each kebel and 90 respondents were included for this survey.

All dairy cattle owned by selected respondents were considered as study population accordingly, there were 448 dairy cattle sampled constituting 147 lactating cows, 70 dry cows, 65 heifers, 76 female calves, 50 male calves and 40 bulls.

Questionnaire Survey: A semi-structured questionnaire was designed and forwarded for selected respondents to assess the major dairy cattle health problems of the study area and measures taken by owners against the problems. It was also framed in such a way that owners could give information that are recent and easy to recall and it was filled directly by face-to-face interviewing of selected dairy cattle owners.

Retrospective Survey: The retrospective survey was conducted to supplement questionnaire survey. Four years (from December, 2007 to March, 2010) past record casebook of sick dairy caws that came to Wukro Veterinary clinic was referred.

Data Analysis: The collected Data were entered in to Microsoft excel spreadsheet (Ms-excel) and analyzed in SPSS version-17.

RESULTS

Result of Questionnaire Survey

Demographic Characterization of the Interviews: From 90 respondents, 88.9% (80/90) were male and 11.1% (10/90) were female. The educational status of respondents indicated that 33.3% (30/90) were uneducated, 16.7% (15/90) had religious knowledge 27.8% (25) were grade 1-8 and 22.2% (20/90) were above grade 8. The top, bottom and average age of the respondents is 65, 20 and 40 respectively.

Table 2: Major Health Challenges of dairy cattle with the respective proportion of the respondents

Major Health Challenges	Local name of the disease	Frequency	Proportion (%) of respondents (N=90)
Reproductive disease			
Mastitis	Himam tub guel	27	30%
Retain fetal membrane	Meskeb	23	25.6%
Abortion	Abereay	21	23.3%
Repeat breading	Adagima	8	8.9%
Anestrum	Mekan	7	7.9%
Uterine prolapse	----------	4	4.4%
Dystocia	Himam hirsi	3	3.3%
Metabolic disease			
Bloat	Nefihi	17	18.9%
Milk fever	----------	4	4.4%
Ketosis	----------	3	3.3%
Respiratory disease			
Pneumonia	Seal	16	17.1%
TB	Aklea	3	3.3%
Parasite disease			
Tick	kurdid	17	18.9
GIT Parasite	W/tesietagan	18	20%
Mange mite	Ekeke	14	15.6%
Other infectious and non infectious disease			
Calf diarrhea	Guahsi/Tekmat	20	22.2%
Lamenes	Sinkale	15	16.7%
Actinomycosis	Zigag	7	7.8%
Black leg	Wekie	5	5.6%
Anthrax	Taffia	4	4.4%

The family size of the household ranges from 1-9 and the mean is about five. Sixty six point seven percent (60/90) of respondents engaged in mixed crop livestock farming system while 33.3% (30/90) of the respondents were only engaged in livestock rearing. Fifty present (45/90) of the respondents owned local breed while fifty percent (45/90) of the respondents owned cross breed of dairy cattle.

Major Health Challenges of Dairy Cattle: The major health challenges were mastitis (30%), retain fetal membrane (25.6%), abortion (23.3%), calf diarrhea (22.2%), internal parasite (20%), tick (18.9%), pneumonia (17.1%), lameness (16.7%) and mange mite (15.6%) were mentioned in declining order as major health challenges of dairy cattle (Table-2).

Dairy Cattle Feed and Availability: Majority of respondents indicated that crop residue, natural pasture and locally prepared feed were the major dairy cattle feed types. The respondents also reported that feed

Table 3: Types of major feed stuff and availability

Feed stuff	Frequency	Preparation of respondents (N=90)
Crop residue	33	36.7%
Natural pasture (Hay)	22	24.4%
Locally prepared	16	17.8%
Cultivated pasture	11	12.2%
Furshca, natural and cultivated pasture	5	5.6%
Furshca and Natura pasture	3	3.3%
Total	90	100

Table 4: Major water source and frequency and proportion (%)

Source	Frequency (N=90)	Proportion (%)
Stagnant	17	18.9
Tap	40	44.4
River	33	36.7
Total	90	100

N=total number of respondents mentioned water source

availability depends on seasons. Feed shortage was the main problem especially during dry season in the study area to maintain dairy cattle development extension (Table 3).

Water Sources: Water is an essential component of the ration for all types of livestock. In the study site they have water sources for watering animal like stagnant water, tap water and river water. Majority (55.6%) of the owner used river and stagnant watering animals. This water sources decrease the amount of water and also not available throughout the year. Shortage of water encountered during drought in dry season especially from October to June at these time farmers use tap water that they live near to the town and others use stagnant water (Table 4).

Interviewees from Adikesandid, Genfel and Aynalem peasant associations complained that the dirty water in their respective peasant association/villages were a cause of parasitic diseases due to this reason their animals were unthrifty (emaciated) even if they eat more and their production was below expected level.

Housing: Fifty six point seven percent of the respondent said that the housing system of dairy cattle were fenced in simple shed which did not protect the animals from sun and cold /rain and37.8% of the respondents mentioned that the housing condition of the animal had a protection from sun, cold/ rain and also the air freely blowing in the house but not have enough space, arranged floor and shallow drainage. The remaining 5.6% of the respondents indicated that the housing system of dairy cattle were keep in well constructed barn as compared to the others which have shallow drainage, the air blow easily in the house, enough animal space, concrete floor and the roof of the house made from corrugated iron.

Table 5: Treatment options of respondents with their respective proportion

Treatment options	Frequency	Proportion
Modern veterinary service	49	54.4%
Traditional medication	8	8.9%
Both	33	36.7%
Total	90	100

Table 6: Measures taken to control diseases by respondents

Measure taken	Frequency	Proportion (%)
Vaccination	43	47.8
Quarantine	14	15.8
Branding	8	8.9
Slaughter	12	13.3%
Do nothing	13	14.4%
Total	90	100

Milking and Mating: Out of 90 respondents, 41.1% mentioned that milking practice was not properly washed the teat and udder of animals. In addition, 58.9% of the respondents indicated that appropriate milking procedure to prevent predisposing factors for mastitis was practiced. Regarding to breeding, 53.3% of the respondent used Artificial insemination and the remaining 46.7% respondents practiced uncontrolled natural mating.

Animal Health Services: Almost all respondents commented that veterinary (animal health) service was inadequate. There were no veterinary doctors and laboratory technicians in veterinary clinic of Wukro.

Utilization of traditional animal diseases treatment was found in the study area and of the total respondents, 8.9% were primarily using traditional to treat their sick dairy cattle. Fifty four point four percent of the respondent took sick dairy cattle to the nearby veterinary clinics. Thirty six point seven percent of the respondent faced distance/ transportation problem used both modern veterinary and traditional treatment in order to treat their sick dairy cattle (Table 5).

From 90 respondents, 47.8% explained that they practiced vaccination to control the occurrence of diseases (Table 6).

Results of Retrospective Survey: Retrospective survey was carried out by referring case book record of sick dairy cows that came to Wukro veterinary clinic from December /2007 to March /12010. According to the finding, 420 sick dairy cows were tentatively diagnosed in clinic during

Table 7: Proportion of the major health challenges of dairy cattle that diagnosed tentatively in wukro veterinary clinic

Major Health challenge	Frequency	Proportion
Reproductive disease		
Mastitis	70	16.7%
Retain fetal membrane	40	9.5%
Abortion	30	7.14%
Dystocia	35	8.3%
Metabolic disease		
Bloat	42	10%
Parasitic disease		
External parasite	85	20.2%
Respiratory disease		
Pneumonia	26	6.2%
Total	420	100

the specific period of which 21.9% were affected by internal parasitism which accounts the major cases when compared to other diseases and followed by external parasite (20.2%) and mastitis (16.7%) (Table 7).

DISCUSSION

The current result showed that many health challenges including inadequate animal health services, inadequate water supply, feed shortage and poor housing management of the dairy cattle were encountered frequently in the study area. For the sake of simplicity disease of the dairy cattle described in the results were divided as reproductive diseases, metabolic diseases, respiratory diseases, parasitic diseases and other infections and non infectious diseases.

Reproductive Diseases: Based on questionnaire and retrospective study mastitis were the most important reproductive health challenges of dairy cattle were responsible for the loss of production. Mastitis has been recorded as one of the major disease of economic importance in the dairy industry worldwide Radostits *et al*. [12]. According to the respondents in the study area, the occurrence of mastitis and its predisposing factors for this disease was tick and unsanitary conditions. This agree with the report of Sewell and Brocklesby [13]. According to Radostits *et al*. [14] most of new udder infections occur during the early part of dry period and in the first 2 months of lactation especially with the environmental pathogens.

According to 25.6% of the respondents retain fetal membrane was the second major health challenges of the reproductive disease in dairy cattle and its occurrence was aggravated by abortion, dystocia, hypocalcemia, twin birth, high environmental temperature advancing age of the cow, placentitis and malnutrition which is in agreement with the reports of Mamo [15] The variation in the prevalence of retain fetal membrane might be attributed to various predisposing factors to which the animals are subjected. Among which nutritional status and management of pregnant cows can be mentioned.

Twenty three point three percent of the respondents mentioned that the occurrence of abortion mainly in dry season, different factors could be mentioned here as triggering factors like climatic conditions (dryness, high temperature and feed shortage) and physical damage besides disease those responsible to cause abortion in pregnant cows. According to Yohannes [16] reported that abortion as economically important health problem of livestock in Alemata worda.

Metabolic Diseases: Metabolic problem was observed to be a major health constraint of dairy cattle causing death and production loss. Among this bloat was the common metabolic disorder that causes sudden death of animals in the study area. it could be suggested that bloat occurs in the study area by sudden change of feed and when the animals feed the cultivated pasture and lush grass during dry season. Moreover, the animal feed the newly grown grass during rainy season.

Respiratory Diseases: Pneumonia was the main respiratory problem of dairy cattle in the study area. The occurrence of this problem might be due to stress, workload and movement of animals during drought period that can favors the bacteria to multiply due to the immune status of the animals were suppressed. Environmental risk factors include close confinement and poor ventilation of the house, high temperature that encourage replication of the diseases. According to Radostits *et al*. [9] indicated that the disease is common when animals are exposed to wet, chilly weather or exhausted by heavy work.

Parasitic Diseases: The findings of this survey indicated that parasitic diseases remain as causes of mortality, loss of production and it also predispose animals to many infectious diseases. Among the parasites, internal parasite (20%) was the first major health challenges of dairy cattle in the study area and its occurrence was higher in dry season. The respondent mentioned predisposing factors for internal parasites were shortage of feed and water especially in dry season. This agree with Tesfaye [17] reported that poorly fed animals develop low disease resistance, fertility problem partly because the animal health care system relies heavily on veterinary measures,

poor grazing management systems continues to cause high mortality and morbidity for example by internal parasites.

Tick infestation was the second parasitic diseases mentioned by respondents that occur mostly in rainy season. Reports of Tesfahiwet [18] and Asfaw [19] indicated that tick burdens were observed in Adaa liben woreda and Borena Province of Ethiopia, respectively. High land districts have lesser tick population relative to low land in addition tick infestation was highest in area by a complex interaction of factors such as climate hot susceptibility and grazing habits [20]. This might be due to that ticks needs moist and warm humidity to hasten their hatchability

Infectious and Non-infectious Diseases: Out of 90 respondents, 22.2% responded that calf diarrhea was among the disease of the dairy cattle frequently encountered in the study area. Sewell and Brocklesby [13] reported that calf scours is one of the worst diseases of dairy calves 10% of calves die from calf scours. According to Yohannes [16], calves could be infected by environmental bacterial such as *Eshershi coli*, salmonella species as well virus like Rotavirus, corona virus and feed change. Hirut [21] reported that failure of passive immunity transfer and over whelming pathogen exposure is the main precipitating factors for calf diarrhea.

Lameness also have economic important for dairy cattle in the study area. This problem manifested by dislocation of joint, malnutrition and damaging of the hoof due to movement of animals for searching of feed and water during drought period, on the time of movement the hoof may damaged by any sharp object this frequently account significant proportion of traumatic health problems. In addition, the second predisposing factor related to improper floor arrangement of the housing system (Surfaces that are too soft, too hard, slippery or rocky may aggravate conformational imperfections or may be the outright cause of lameness).

CONCLUSION

The current study revealed that disease like mastitis, retain fetal membrane, abortion, calf diarrhea, pneumonia, internal parasite, external parasite bloat and lameness were the major health challenges of dairy cattle in the study area. These diseases are the leading causes for mortality, production loses, reduce growth rate and reduce reproductive ability of dairy cattle. Adequate veterinary services in the area were very poor as a result dairy cattle frequently suffer from these diseases. As the consequence, this disease affects both the local national economy, so improvement in management practices such as good housing, feeding and health care, could help in minimizing the major health challenges of the dairy cattle in the study area.

Based on the above conclusion the following recommendations were forwarded.

- Predisposing factors for diseases like shortage of feed and water and proper management practices should be alleviated and improved.
- Further research should be conducted on health challenges of dairy cattle so that proper control and preventive measures will be devised.
- Awareness should be created at farmers' level on the identification of diseases and their available control means.

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