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Major Reproductive Health Disorders of Cow in and Around Gondar, North West Ethiopia

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Abstract: The study was conducted to identify the major reproductive health problems and its associated risk factors in pregnant cows in and around Gondar Ethiopia between November 2014 and April 2015. Out of the total 245 cows examined, 71(29%) were having at least one of the reproductive problems identified by regular follow up of individual cows. The major reproductive health problems identified in the present study were dystocia (15.5%), abortion (19.7%), retained fetal membrane (31%), repeat breed (21.1%) and clinical endometritis (12.7%). The overall prevalence of reproductive problems showed significant difference ($p<0.05$) with respect to body condition and age of dairy cattle where major reproductive health problems were observed more frequently in poor body conditioned and pluriparus cows. Whereas breed were not found to have a significant influence ($p>0.05$) on the occurrence of reproductive problems in the area. Therefore, it is recommended that awareness creation to farm owners, attendants and improved management such as, proper feeding and health management should be improved to minimize the occurrence of these problems and associated economic losses in the dairy farms of the area.

Key words: Cattle · Ethiopia · Gondar · Reproductive Health · Risk Factor

INTRODUCTION

Cattle production has been considered as the main component of agricultural development in most parts of sub-Saharan Africa. The overall cost of keeping cattle in terms of costs associated with the health care, nutrition and reproduction management, however, has not matched to their contribution to the livelihood and the economy of the people in the region. As in many countries, livestock, particularly cattle play multiple roles in Ethiopia being a source of milk, meat, hide, etc [1].

Ethiopia maintains huge number of livestock population. However, the low economic returns from these resources are associated with several factors such as diseases, poor management and low genetic potential of indigenous breeds. Among which, reproductive health problems cause considerable economic loss to the dairy industry. This is due to slower uterine involution, prolonged inter-conception and calving interval, negative effect on fertility, increased cost of medication, drop in milk production and early depreciation of potentially useful cows [2, 3].

Despite the huge number of cattle and their economic importance, the productivity is low due to the constraints of disease, nutrition, poor management, lack of marketing facilities and opportunity, inadequate animal health services, uncoordinated development programs between various levels of government institutions and /or non-government organizations and poor performance of indigenous breeds. These constraints result in poor reproductive performance of dairy cattle[4]. In the last few decades, as the major epidemic disease, were brought under control, emphasis have increasingly shifted to economically important diseases to the dairy producers and reproductive health problem stands out as the most prominent [5].

Each of these aspects of reproductive function can be affected by management, disease and the genetic make-up of the animal. When the function of the reproductive system is impaired, cows fail to produce a calf regularly. Among the major reproductive problems that have direct impact on reproductive performance of dairy cows are abortion, dystocia, Retained Fetal Membrane (RFM), pyometra, metritis, prolapse (uterine

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and vaginal), anoestrus and repeat breeder. They are classified as (anoestrous and repeat breeding), during gestation (abortion, vagina prolapsed and dystocia) and after gestation (retained fetal membrane and uterine prolapsed)[6].

Upon closer examination of reproductive processes in the dairy cattle, the post-partum period is the most varied and vulnerable to problems and that incidentally coincides with the peak of milk production, uterine involution and resumption of ovarian activity, conception and greater risk to infection [7]. These result in considerable economic loss to the dairy industry due to slower uterine involution, reduced reproductive rate, prolonged inter-conception and calving interval, negative effect on fertility, increased cost of medication, drop in milk production, reduced calf crop and early depreciation of potentially useful cows [8].

It is very difficult to diagnose those problems by one particular disorder or symptom because there is interrelation between predisposing factors such as management at calving, hygiene and parity, stage of gestation, nutrition and environment [9]. In Ethiopia, even though dairy cattle are maintained under different production systems, the differences in management and environmental conditions under which cattle are maintained could greatly affect the occurrence of reproductive disorders. In spite of this fact, little has been known about the magnitude of the major reproductive disorders in dairy cows in and around Gondar town. Therefore, this study was designed to identify the prevalence of the major reproductive disorders of dairy cows in and around Gondar town.

MATERIALS AND METHODS

Study Area: The study will be conducted in and around Gondar town, which is found in Amhara Regional State. Gondar is located in North Western part of Ethiopia at about 738km away from Addis Ababa. It is situated at 12°36´N latitude and 33 º 28´E longitudes with an altitude of about 2300m above sea level with an average temperature of 20ºC and an average annual rainfall of 1800mm being a highland area. The area is located under midaltitude, agro-climatic zone and receives a bimodal rain fall. The human population of the town is 2,896,873 of which 1,569,205 are males and 1,327,668 are females and the cattle population is (8,202), goat (22,590), sheep (2,695), horse (1,065) and donkey (9001) [10].

Study Design: The cross sectional type of study was under taken from November 2014 to April 2015 to determine the major reproductive problems of dairy cattle and the study constituted farm follow up on the target dairy cow that found in and around Gondar town farm. The study animals were identified by their tag number/ID, parity and pregnant animals that were suspected to give birth within the study period and heifer that has age of 2 years and above were included and followed up from the start to the end of study period. To do this observational format was prepared and filled so as to increase the reliability of information collected in questionnaire. Cows that delivered were observed for the presence of retained fetal membrane left hanging in the vulva in the first 24 h and if any abnormal vaginal discharge occurred without regular frequency of visit.

Body Condition Scoring: the Body Condition Scoring (BCS) was determined according to Nicholson and Butterworth [11] for all cows under the study their body condition grouped from poor to good.

Study Population: According to CSA the livestock population of Gondar registered is cattle (8,202), goat (22,590), sheep (2,695), horse (1,065) and donkey (9001). However, the target for this study was only cattle specially the pregnant cow, the study constitute 245 pregnant cow with different parity, management and body conditions were included in this study. Both local (n=52) and cross (n=193) breeds dairy cattle which were kept under different management systems was also investigated. Classification of management systems was done based on the criteria adopted by Richard [12].

Sample Size: The sample size was calculated according to Thrusfield [13] by considering 26.3% expected prevalence from previous study of Lobago *et al.* [2] and 5% desired absolute precision at 95 % confidence interval using the following formula:

$$n = 1.962 \exp (1-pexp)/d2$$

Where,
N = Total number of sample size
P exp = Expected prevalence
d = Absolute precision
Therefore, the sample size was about 295

Data Collection: A total of 295 pregnant cows' data were collected from different farm that found in and around Gondar town and follow up them.

Data Management and Analysis: Both cross sectional study and the regular clinical follow up result was entered to Microsoft Excel sheet 2007 and analyze using a soft ware SPSS (vertion16). Description statistical data analysis technique was used. The different parameter that considers during the study period were analyzed using the Chi-square technique and their possible association with major reproductive health disorder was also tested using these technique.

RESULTS

From a total of 245 dairy cow during the study period the prevalence rate of reproductive disorder found in and around Gondar town farm was 29% (n=71). The major reproductive disorders in Gondar farm were dystocia, abortion, retained fetal member, repeat breeding and metritis. The differences in parameters *viz.* age, body condition, parity and other factors on reproductive problems were analyzed by using ÷2 (Chi-square) technique and the level of significance was set at $p< 0.05$.

Table 1: Effect of breed, age and body condition on occurrence of major reproductive problem

Factor	No. of cow examined	No. cow affected	Percent	X^2	P value
Breed-				1.019	0.313
Local	52	18	34.6%		
Cross	193	53	27.5%		
Age				23.488	0.000
Adult	91	43	47.3%		
Old	154	28	18.2%		
BCS				14.029	0.001
Poor	10	8	80%		
Medium	64	20	31.2%		
Good	171	43	25.1%		

Table 2: The major reproductive problem that occur in and around Gondar farm

Type of reproductive problem	No. of cow with reproductive problem	Percent
Dystocia	11	15.5%
Abortion	14	19.7%
RFM	22	31.0%
Repeat breeder	15	21.1%
Metritis	9	12.7%
Total	71	100%

An increased rate of reproductive health problems with increased age and parity of cows was due to the fact that frequency of exposure to reproductive health problems with increased age and parity, decreased defense mechanisms and lack of uterine tone and slow involution of the uterus at higher parities (Table, 1). High prevalence of reproductive health problems in poor and good body condition and less in medium condition in the present finding.

From the major post-partum disease metritis and RFM account 12.7% from overall 29% that occur in and around Gondar town dairy farm (Table, 2). The body condition and age have highly significant effect on occurrence of major reproductive problem where disorder is decreased from good to medium size and decreased from adult to old one respectively but, there is no significance change in the breed of the animal.

DISCUSSIONS

This study revealed, that male entrepreneurs and educated one cover majority of the dairy farm operations, showing that majority of dairying in and around Gondar is mainly male domain and the majorities were educated and the majority of the farms were located in urban area. In our study, from total of 245 examined animals, 71 animals was positive for the major reproductive problem with overall prevalence of 29%. From this problem dystocia is the first one which account 4.5% from total 29% of major problem, according to Anderson *et al*.[14] dystocia is the primary occurrence among first calf heifer as a result of feto pelvic disproportion.

In this study metritis, repeat breeder, abortion, RFM and dystocia were found to be the major reproductive health problems containing 12.7%, 21.1%, 19.7%, 31.0% and15.5respectively. The higher prevalence of repeated breeding (21.1%) found in the present study is in close agreement with prevalence rate reported by Hadush *et al.*[15] from central Ethiopia. Repeated breeding can be caused by a number of factors, including sub-fertile bulls, endocrine imbalance, malnutrition, reproductive tract infections and poor management practices such as wrong time of insemination or faulty heat detection, inappropriate semen handling and insemination techniques. In addition to these, communal use of bull for natural services also considered as contributing factor. Hence the difference between the findings of the current study and previous reports may be attributed to the above-mentioned factors [16].

The prevalence rate of RFM (31%) in recent study is not similar with the 8.6% reported by Molalegn and Shiv [17] and (14.28%) reported by Mamo[18] and 19.2% by Gashaw *et al.* [19]. The variation in the incidence of RFM may be attributed to variations in predisposing factors to which the animals are subjected to; among which include nutritional status and management such as lack of exercise. The prevalence rate of RFM in the current study could also be due to dystocia which is an important predisposing factor for occurrence of RFM [19]. Previous report on the prevalence of dystocia by Mamo [18], 5.79% in small holder dairy cows in and around Debre Zeiet fairly disagrees to the prevalence of 15.7% obtained in this study. However, the current finding is higher than the Gashaw *et al*.[19] (3.8%) and Hadush *et al.*[15] (2.9%).

This variation in the occurrence of dystocia may be due to the fact that it is influenced by the factors such as, age and parity of the dam as well as breed of the sire. Inseminating cows with semen collected from large sized bulls without taking into account the size and age of cows is an important factor in precipitating dystocia [20].

The prevalence rate of abortion (19.7%) recorded in this study is nearly similar to 14.6% reported by Hunduma [21]. The lower prevalence rate of abortion may be attributed to the increasing practice of AI in the study area (66.7%) where the semen is collected from bulls free from brucellosis, in addition breed, management system specially feeding and sanitation, study methodology and geographical location differences are all sources of differences in prevalence of abortion [18].

The animal with poor body condition score were highly affected with reproductive disorder as compared to animal with a good body condition score that is similar with Gebremariyam *et al.* [8] who report inverse proportion b/n body condition and reproductive problem b/c the animal good body condition are those animal with good feed in take capacity and having resistant to different environmental stress and disease. The finding of higher prevalence of reproductive health problems in cows with relatively good body condition compared to those with poor body condition seems to contradict previous explanations that indicated cows in poor condition are the most susceptible to reproductive health problems due to the weak expulsive force to expel out the fetal membranes leading to secondary complications [22] and the poor body defense mechanism that increases the rate of infection [23].

The current finding may be due to the confounding effect of other factors such as parity, breed or management system in that those cows with fairly good condition might be pluripara, crossbreed or under intensive management which all predispose to reproductive health problems. The multiparas cows are more affected with major reproductive disorder than that of primipara as reported earlier by Melkamu[24].

The other important reproductive problem was repeated breed which occur 6.1% from the total of 29% of problem that agreed with Wolfe [25] who describe that reproductive performance decrease with increase of parity number of female cow.

Repeated breeding can be caused by a number of factors, including sub-fertile bulls, endocrine imbalance, malnutrition, reproductive tract infections and poor management practices such as wrong time of insemination or faulty heat detection, inappropriate semen handling and insemination techniques [24]. Other problem like abortion, metritis and retained fetal membrane occur 5.7%, 3.7% and 9% respectively in this study. Finally in our study the major disorder found is that RFM, repeat breed, abortion, Dystocia and metritis that is common in and around Gondar town farm.

CONCLUSION

This study revealed that reproductive health problems particularly of repeat breeder, abortion, metritis, RFM and dystocia were the major causes of low reproductive performance of dairy farms in and around Gondar town. The Possible risk factors responsible for the occurrence of reproductive health problems identified include body condition and ages. Improvements in management systems (such as housing, feeding and health care), heat detection and proper selection of bulls for breeding taking into account the size of cows could help in minimizing reproductive health problems and hence, improve the reproductive efficiency dairy cows in the study area. It was found that reproductive disorder most of the time occur as a complex rather than appearing as a single abnormality and result suggests that the cow in and around Gondar farm were affected by different major reproductive health disorder with varying amount. But this study tried to point out the magnitude of major reproductive disorder and their relative importance, the association of the disorder with body condition, age and breed. High prevalence of such interrelated problems require further study to identify the most important one as to design control strategy and community awareness on its early control and prevention activities in the study area.

From all these facts, the following recommendations have been forwarded:-

- Routine and periodical examination of cows during postpartum period was essential; since most cows acquire uterine infection during this period.
- Proper feeding was very important to control the reproductive disorders as found in this study that those cows having high body conditions were affected to some extent by RDs.
- The reproductive disorders in the study site were multifactorial. Therefore, detailed studies should be conducted to identify etiology, distribution and prevalence.
- The clinical endometritis was directly associated with predisposing factors like abortion, dystocia and RFM so, it was possible to control clinical endometrits by controlling the predisposing factors.

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