

Major Reproductive Health Disorders in Cross Breed Dairy Cows in Ada'a District, East Shoa, Ethiopia

Getachew Esheti and Nibret Moges

Department of Veterinary Clinical Studies, Faculty of Veterinary Medicine,
University of Gondar, P.O. Box: 196, Gondar, Ethiopia

Abstract: Questionnaire survey and regular clinical follow up were conducted to estimate the major reproductive health disorders of dairy cows in ILCA and Almaz dairy farms in Ada'a district, Debre Zeit town, south east of Addis Ababa from November 2013 to April 2014. From 245 cows which were under investigation 91 (37.1%) had at least one of the reproductive disorders. The reproductive disorders according to their relative importance in ILCA and Almaz dairy farms were repeat breeding 39 (15.9%), abortion 13(5.3%), dystocia 8(3.3%), clinical endometritis 3(1.2%), retained fetal membrane (RFM) 2 (0.8%), respectively also the overall mixed disorder was 26 (10.6%). The degree of association of risk factors was assessed and parity found to be directly associated and the association was not significant. However, body condition scores and age had significant differences on the occurrence of reproductive disorders. This particular study indicated reproductive disorders which included clinical endometritis, abortion, RFM, dystocia and repeat breeding were one of the major reproductive disorders responsible for the low reproductive performance of dairy cows. Routine and periodical examination of cows during postpartum period was essential; since most cows acquire uterine infection during this period.

Key words: Ada'a • Breed • Ethiopia • ILCA • Reproductive Disorders

INTRODUCTION

For several years, Ethiopia ranked first in cattle population in Africa. However, the dairy industry is not as developed as that of east African countries. Consequently, national milk production remains among the lowest in the world even by African standard. However, there is a slow and gradual overall growth in milk production in Africa owing to cross breeding program that are being introduced into many tropical countries to increase milk production Kassa and Lema [1]. Despite the huge number of cattle in the country, productivity is low due to constraints of disease, nutrition, poor management and poor performance of endogenous breed. These constraints result from poor reproductive performance of dairy cattle and lower economic benefit from the sector Bitew and prased [2]. Among the major problem that has direct impact on reproductive performance of dairy cows are abortion,

dystocia, retained fetal membrane, repeat breeding, clinical endometritis. This could be classified as postpartum and prepartum Forar *et al.* [3].

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 disorders stands out as the most prominent Ruegg *et al.* [4]. Up on closer examination of the reproductive process in dairy cattle, the postpartum period is the most varied and the most vulnerable to problems and that incidentally coincides with the maximum of milk production, uterine involution, resumption of ovarian activity and conception Lobago *et al.* [5].

Dairy cows reproduction is affected by a variety of factors and increasingly trend of intensification the role of the different aspects of management including nutrition and breeding become significant Galina and Arthur [6].

Corresponding Author: Nibret Moges, Department Of Veterinary Clinical Studies,
Faculty of Veterinary Medicine, University of Gondar, P.O. Box 196, Gondar, Ethiopia.

Reproductive health disorders cause considerable economic loss to the dairy industry due to slower uterine involution, prolonged inter conception and calving interval, negative effect on fertility, drop in milk production and early depreciation of potentially useful cows Corea *et al.* [7]. Although, there are enough dairy farms in Ada'a district, ample studies have not been conducted on the major reproductive health disorders in dairy animals. Therefore, the objective of this study was to identify major reproductive disorders in cross breed dairy cattle in two selected farms in Ada'a district and to estimate the prevalence of such disorders in these dairy farms.

MATERIALS AND METHODS

Study Area: This study was conducted in Ada'a district, Debre Zeit town which is located 47 km south east of Addis Ababa, Ethiopia. The town lies between 9°N latitude up to 40°E longitudes and has an altitude of 1950 m. a. s. l. The area is characterized by mild subtropical with the minimum and maximum temperature ranging from 2-9 °C and 20-27°C respectively. The rainfall is bimodal with an annual rainfall of 1151.6 mm of which 84% is during the long rainy season covering June to September and the remaining in the short rainy season.

Study Animals and Study Populations: According to CSA [8] the livestock population of Debre Zeit registered cattle 160,697, sheep 22,181, goat 37,510, horse 5660, donkey 38,726, mule 268 and poultry 191,380. However, the target for this study was only cattle especially dairy cattle. The study population constituted of 245 Holstein, Borena cross breed cows. These animals were kept in the same management systems. Sampled animals constituted different age groups, body condition score and have various numbers of parity.

Sample Size: The sample size was calculated according to Thrusfield [9] by considering 26.3% expected prevalence from previous study Lobago *et al.* [5] and 5% desired absolute precision at 95 % confidence interval using the following formula:

$$N = \frac{(1.96)^2 (P_{exp})(1-P_{exp})}{d^2}$$

where,

N = Total number of sample size

P_{exp} = Expected prevalence

d = Absolute precision

Therefore, the sample size was about 295; but, the farms in which the study was conducted gradually culled 50 animals due to various reasons *i.e.* to get cash by selling cows for cafeteria, animals with reproductive disorders, digestion problems and those which have feed conversion problems; so that, the sample size to find the prevalence of Reproductive disorders was 245.

Study Design: The cross-sectional type of study was undertaken from November 2013 to April 2014. The study constituted questionnaire survey and clinical follow up on the targeted cross breed dairy cows.

Questionnaire Survey: To get information, thorough explanation on the objectives of the study was given to workers before the start of the interview. Then questions asked about major reproductive disorders like abortion, dystocia, retained fetal membrane, clinical endometritis, repeat breeder, management systems and parity. Animals grouped, those having the major reproductive disorders and those without these problems. Questionnaire survey included about 180 cows.

Regular Follow Up: About 65 cows randomly selected in two farms in Ada'a district within the study period. These cows subjected to different clinical and gynecological examinations including rectal palpation and findings recorded.

Data Management and Analysis: Both the cross-sectional study and the regular clinical follow up result was entered to a Microsoft Excel sheet 2007 and analyzed using a software SPSS (version 16). Descriptive statistical data analysis technique was used. The different parameters (that are parity, age and body condition score) that were considered during the study period were analyzed using the Chi-square technique and their possible association with major reproductive health disorders was also tested using these techniques.

RESULTS

From a total of 245 dairy cows during the study period the prevalence rate of reproductive disorders found in ILCA and Almaz dairy farms was 37.1%(n=91). The major reproductive disorders in two selected farms were clinical endometritis, retained fetal membrane, repeat breeding, dystocia and abortion. The overall prevalence of the disorders accounted for 37.1% of which 2 % (n=5)

Table 1: Reproductive disorders in Ada'a district on different method of study.

Method of study	No. of cows examined	No. of cows with reproductive disorders	Percent affected
Questionnaire survey	180	65	26.5%
Regular follow- up	65	26	10.6%
Total	245	91	37.1%

Table 2: Effect of parity number, body condition score and age on the prevalence rate of the major reproductive health disorders

Factors	Variables	Total no. of cows examined	Total no. of cows affected (%)	X ²	P value
BCS	Poor	121	32(13%)	70.901	0.000
	Medium	56	17(6.9%)		
	Good	68	42(17.1%)		
Parity	Primiparous	77	17(6.9%)	16.427	0.126
	Multiparous	168	74(30.2%)		
Age	8-10 years	92	20(8.1%)	1.268	0.000
	5-7.9 years	62	19(7.7%)		
	3.1-4.9 years	34	10(4.0%)		
	1.5-3 years	57	42(17.0%)		

Table 3: Relative occurrence of major reproductive disorders in Ada'a district

Types of RDs	Questionnaire survey no. (%)	Regular follow up no. (%)	Total
Repeat breeding	35(19.4%)	4(6.1%)	39(15.9%)
Abortion	10(5.5%)	3(4.6%)	13(5.3%)
Dystocia	6(3.3%)	2(3%)	8(3.3%)
Clinical endometritis	2(1.1%)	1(1.5%)	3(1.2%)
Retained fetal membrane	1(0.5%)	7(10.7%)	2 (0.8%)
Mixed disorder	19(10.5%)	7(10.7%)	26(10.6%)
Total	73(40.5%)	18(27.7%)	91(37.1%)

were found with clinical endometritis and retained fetal membrane, which were considered to be the major post-partum reproductive disorders.

The effect of body condition on the prevalence rate of the major pp reproductive disorders decreased from good to poor animals with prevalence of 17.1% and 13%, respectively (Table 2). Generally, body condition had highly significant effect ($p < 0.05$) on the prevalence of the major pp reproductive disorders.

Parity number was not statistically significant ($p > 0.05$) on the prevalence rate of the reproductive disorders and the effect increased progressively from primiparous to multiparous with prevalence of 6.9% and 30.2%, respectively.

The prevalence rate of major reproductive disorders decreased from heifer to older cows with prevalence of 17% and 8.1%, respectively. Age was highly significant ($p < 0.05$) on the prevalence of the major reproductive disorders.

DISCUSSION

In the present study a total of 245 animals examined during the study period, 91 animals were positive for reproductive disorders with overall prevalence of 37.1%.

Wrong times of insemination or faulty heat detection, lack of quality feed, as well as problems in semen handling and insemination techniques could be possibly associated with the high prevalence rate. In the tropics, depressed estrus in cattle has been found to be a common occurrence Bolinder *et al.* [10] however, comparatively better estrus manifestation in crossbred cow is reported and this could have contributed to the improved performance among this group of cows Bosu and Peter [11].

The prevalence of abortion in ILCA and Almaz dairy farms in the present study was 5.3%, which is a bit less than the findings of Awad *et al.* [12] who reported an abortion rate of 6.52% in Egypt. However, this finding agrees with that of Tekelye *et al.* [13] Tekelye *et al.* [14] and Zewdu [15] who have reported an incidence rate of abortion ranging from 1.7 to 20.2%, 1.1 to 8.4% and 1.5 to 7.5%, respectively in Ethiopia. In fact, the incidence rate of abortion more than 2-5% should be viewed seriously and efforts must be made to determine its cause so that proper methods of control may be instituted [16].

Prevalence of repeat breeding in the present study reveals 15.9% which agree with the finding of Putnam [17] who reported 5-18% range. This high incidence of repeat breeding might be due lack of quality feed, wrong

insemination time and lack of quality semen. Also repeat breeding with regard to parity is 6.9% and 30.2% in primiparous and multiparous, respectively. This finding agree with Wolfe [18] who described that reproductive performance declined with increase of parity number of the female cattle. This effect of parity number on the prevalence of the repeat breeding is probably due to repeated exposure of the multipara genital tract to environmental factors, which indeed, caused uterine infections; also older cattle are not as such good in feed intake capacity.

The declines in reproductive performance of cows with the extreme fat deposition have been reported Robinson [19] which contradicts with the present findings in those cows with poor body condition score has a slightly higher repeat breeder cases.

Various authors [20-22] all reported that there was a high degree of association between uterine infections and the subsequent predisposing factors (Abortion, dystocia, RFM). Clinical endometritis has been shown to occur without predisposing factors due to the open genital tract after parturition, which create favorable uterine environment to facilitate the quick multiplication and growth of the normal uterine flora [23].

Another important clinical reproductive disorder found in the present study was dystocia, which accounted for 3.3% of the total 37.1% of the major reproductive disorders. According to Anderson *et al.* [24] dystocia primary occurs among first calf heifers as a result of feto pelvic disproportion *i.e.*, because of calf size or pelvic dimension of dam but, in the present study cows which gave more birth were prone to dystocia.

In the present study, animals with poor body condition score were less affected with reproductive disorders compared to with a good body condition score, which is similar to the earlier findings of Gebremariam [25] who reported that there has been an inverse relationship of decreased body condition and corresponding reproductive disorders. Body condition score is a useful indicator of nutritional status of cows [26, 14]. The present finding which indicated 13% cows with a poor body condition affected compared to 17.1% of cows with good body condition can be explained by cows with poor body condition score were mostly cows with good feed intake capacity and having resistance to different environmental stresses.

Significant effect of parity number on the prevalence of post-partum disorders as the present study indicated, multipara cows were more affected by reproductive

disorders than the primipara as has also reported earlier, by Melkamu and Gebremariam [27]. Dessalegn [28] attributed this effect of parity number on the prevalence of the major reproductive disorders is probably due to repeated exposure of the multipara genital tract to environmental factors, which indeed, caused uterine infections. Erb and Martin [29] found that uterine involution was significantly delayed as the parity increases and thereby the interval from calving to ovarian resumption was also prolonged.

Finally, as can be seen from table 3, the present study found that repeat breeding, abortion, dystocia, endometritis, RFM were the major reproductive disorders in the area in their relative importance.

CONCLUSIONS AND RECOMMENDATIONS

The ultimate goal in each herd should be to lower calving interval, decrease the number of services per conception thereby increasing herd production. But reproductive health disorders such as Clinical endometritis, abortion, RFM, dystocia and repeat breeder affect the reproductive performance of the dairy cows, the number of potential replacement needed to maintain a constant herd size and the longevity of the cow in the herd. From this study, it is found that reproductive disorders, most of the time occurs as a complex rather than appearing as a single abnormality and results suggests that the cows in ILCA and Almaz dairy farms were affected by different major reproductive health disorders with varying amounts. Up on closer examination of the reproductive process in dairy cattle, the postpartum period was the most

varied and the most vulnerable to problems and that incidentally coincides with the maximum of milk production, uterine involution, resumption of ovarian activity and conception. So, this study tried to point out the magnitude of major reproductive disorders and their relative importance, the association of the disorders with body condition, age and parity. In line with these conclusions the following points are recommended.

- 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.
- This study showed clinical endometritis was directly associated with predisposing factors like abortion, dystocia and RFM so, it was possible to control clinical endometritis by controlling the predisposing factors.

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