

Full Length Research Paper

## Major prepartum and postpartum reproductive problems of dairy cattle in Central Ethiopia

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A survey to determine major prepartum and postpartum reproductive problems of dairy cattle was carried out in three selected dairy farms in Debre Zeit town. Retrospective data analysis together with survey on major prepartum and postpartum reproductive problems were carried out through regular clinical follow up. A retrospective analysis of clinical data collected from a total of 711 cows in three farms was done and 44.3% of the cows were found with major prepartum and postpartum reproductive problems. Postpartum anestrus (12.9%) was the major reproductive problem followed by repeat breeding (11.4%) in the retrospective study. A total of 104 cows were used in the regular follow up and 33.6% (n =35) were found to be affected either with one or more of clinical reproductive problems. Postpartum anestrus (12.5%) was found to be the leading reproductive problem followed by repeat breeding (10.6%), metritis (8.7%), abortion (6.7%), retained placenta (3.8%), dystocia (2.9%) and prolapse (1.9%). Statistical analysis was performed to evaluate the difference in prevalence of the major reproductive problems on the basis of parity and body condition score. Hence, the impact of increasing parity on the occurrence of reproductive problems was examined and there is a direct relationship between increasing parity and prevalence of the reproductive problems with a highly significant variation ( $P<0.01$ ) between primiparous and pluriparous cows. There is an inverse relationship of body condition and prevalence of reproductive problems with a highly significant variation ( $P<0.01$ ). This study demonstrated that anestrus, repeat breeding, metritis and abortion were noticed as the most common major reproductive problems in the study farms in Debre Zeit town, Central Ethiopia.

**Key words:** Anestrus, postpartum, prepartum, repeat breeder, reproductive problems, survey.

### INTRODUCTION

Livestock are vital sources of economic and social support for millions of poor people throughout Africa. Although Ethiopia is known to have a large livestock population, the contribution of livestock does not commensurate with the number of animals or the extent of land resources used. The major contributing factors that have impeded the full exploitation of cattle potential in Ethiopia are seasonality and quality of nutrition, low genetic potential for production in indigenous breeds,

occurrence of disease and parasites, poor livestock management systems, and large socio-economic factors (Tegegne, 1989; International Livestock Centre for Africa (ILCA), 1998). Majority of Ethiopian cattle have been reported to be indigenous breeds and small non-descript Zebu types (Mukasa-Mugerwa, 1989) that are poor in major economically important traits but they have got adaptation to tropical climates (Tegegne, 1989).

Cross breeding with improved exotic dairy breeds in

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wide scale has been introduced as an option some 36 years back (Brannang et al., 1980) for upgrading the genetic potential of the indigenous Zebu cattle and subsequently to improve the dairy sector in Ethiopia. Moreover, the development and use of artificial insemination (AI) techniques have also revolutionized cattle production and genetic improvement, particularly in the dairy sectors (Tegegne et al., 1995). The performances of animals depend not only on their genetic merit, but also on other factors like nutrition, management, health and environment. On the other hand, reproduction is a vital factor in determining the efficiency of animal production (Peters and Ball, 1995). Thus, the success of cross breeding programme needs to be monitored regularly, by assessing the performances of crossbred cows under the existing management system.

Ethiopia is a country which is known for its highest livestock population from Africa. However, its level of productivity is low due to the constraints of disease, nutrition, poor management and poor performance of indigenous breeds. These constraints also result in poor reproductive performance of dairy cattle. Among the major problems that have a direct impact on reproductive performance of dairy cows are: abortion, retention of the fetal membrane (RFM) and metritis. These results in considerable economic losses to the dairy industry due to slower uterine involution, reduced reproductive rate, prolonged inter conception and calving interval, cost of medication, drop in milk production, reduced calf drop, and early depreciation of potentially useful cows (Thomas, 1989; Barnouin and Chacoranc, 1992; Merga, 1992).

Although, the major reproductive problems are greatly responsible for high economic loss in the dairy industry, there is scarcity of reliable information regarding the reproductive performances of dairy cows in subsistence dairy farms in the tropics, particularly in Ethiopia. Information pertaining to reproductive performance and interacting factors is of paramount importance primarily to the livestock owners and also to the extension agents, veterinarians and researchers. Moreover, it can assist in the development of strategies and prioritization of possible intervention options for performance improvement. Accordingly, the objective of this study was to identify major prepartum and postpartum reproductive problems of dairy cattle in the selected farms and to compare their relative occurrences.

## MATERIALS AND METHODS

### Study area

This study was conducted in Debre Zeit town which is located 47 km South East of Addis Ababa, Ethiopia. The town lies between 9°N latitude and 40°E longitudes and has an altitude of 1950 m above sea level. 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

extending from March to May. The dry season extended from October to February. The mean maximum and minimum temperature of the area are 34.7 and 8.5°C, respectively, and mean relative humidity is 61.3%. Mixed farming system followed in the area, crop and livestock production are an intensive type of production (NMSA, 2004).

### Study animals

In this study, all animals which gave birth between first November, 2009 and end of February, 2010 were used. The cows used in this study were Holstein Friesian of different parity, but kept under similar production system (intensive type of management) in selected farms in Debre Zeit town.

### Study design

The study had two parts; the first study was a retrospective data collection and analysis to establish the prevalence and to identify the major reproductive disorders in the selected farms. The second part of the study was a regular clinical follow up on purposively selected dairy cows kept by the selected dairy farms.

### Data collection

#### Secondary data

Secondary data was collected from the record books kept by the farms in the last three years; from January, 2006 to December, 2008 to identify the major prepartum and postpartum reproductive problems and to assess their prevalence in the selected farms.

#### Regular follow up

A regular visit of the farms was carried out to collect data on the major prepartum and postpartum reproductive problems of dairy cows. The study animals were identified by their tag number/ID, breed, parity and followed up their gestation time until delivery and 85 days post delivery by referring their individual case book for time of delivery. During gestation, at and following calving, cows were closely observed; their body temperature measured and feed consumption monitored. After delivery, cows were examined for the presence of retained fetal membrane left hanging in the vulva in the first 24 h and if any abnormal vaginal discharge occurred. Cows with abnormal vaginal discharge were subjected to vaginoscopy to determine the type and nature of the vaginal discharge according to Bekena et al. (1994a).

Finally, parturient cows were grouped in to those giving birth without any problem and those giving birth with problems according to the following definitions.

**Abortion:** Is the expulsion of a dead fetus of recognizable size at any stage of gestation (Robert, 1986; Bekana et al., 1994a, b; Noakes, 1986).

**Dystocia:** A condition in which the first or especially the second stage of parturition was prolonged markedly for more than 6 h and the cow required assistance (Robert, 1986; Stevenson and Call, 1988; Noakes, 1986).

**RFM:** A lack of expulsion of the placenta with in the first 24 h after calving (Robert, 1986; Arthur et al., 1989; Bekana et al., 1994a, b).

**Metritis:** An inflammation of the uterine wall characterized by reddish brown, white or whitish to yellow mucopurulent, with fetid vaginal discharge along with thickness of uterine wall at transrectal palpation (Morrow, 1980; Robert, 1986; Bekana et al., 1994a, b).

**Repeat breeders:** A cow or a heifer that failed to conceive for three or more consecutive services time (Morrow, 1980; Allenstein, 1981; Robert, 1986; Noakes, 1986; Shiferaw et al., 2003).

**Anestrus:** Cows which failed to show clinical heat signs for 90 days or more after parturition (Hafez, 1993; Bekana et al., 1994a, b).

**Uterine prolapse:** The coming out of uterus through the vulva commonly shortly after parturition and hanged out with the inner surface outer most (Morrow, 1980; Noakes, 1986).

**Vaginal prolapse:** The protrusion of the vagina and sometimes with the cervix through the vulva (Noakes, 1986; Robert, 1986).

### **Body condition scoring**

For all of the animals under study, body condition was scored in order to assess the nutritional status of the animal and the prevalence of post parturient reproductive problems. Therefore, animals were grouped in to 0, 1, 2, 3, 4 and 5 body condition scores according to Richard (1993).

### **Data management and statistical analysis**

Both the retrospective data and the regular clinical follow up result was entered to a Microsoft Excel sheet 2007 and analyzed using a software SPSS® version 16. The different parameters (that is, parity, management and body condition score) that were considered during the study period were analyzed using the Chi-square technique. The possible association of metritis with abortion, dystocia and RFM was also tested using these techniques.

## **RESULTS**

In the retrospective study, from a total of 711 assessed recorded data on pregnant and parturient cows during the last three years, 44.3% (n=315) were found with major prepartum and postpartum reproductive problems. Postpartum anestrus accounted for the highest prevalence of 12.9% followed by repeat breeding, abortion, dystocia, RFM, metritis and vaginal/uterine prolapse that accounted for 11.4, 6.6, 4.2, 3.5, 3.5 and 0.7%, respectively in the three farms.

During the survey using regular follow up, a total of 35 (33.6%) cows were diagnosed to be affected at least by one of the major prepartum and postpartum reproductive problems. The average prevalence of abortion, dystocia, RFM, prolapse, metritis, anestrus and repeat breeding in the three farms during the regular follow up was found to be 6.7, 2.9, 3.8, 1.9, 8.7, 12.5 and 10.6%, respectively. Out of the total 35 affected cows, some 16 (45.7%) of them were diagnosed to have more than one reproductive problems.

The relative occurrence of abortion on the base of stage of gestation was assessed and the corresponding

results in the first, second and third trimester was 1 (14.3%), 2 (28.6%) and 4 (57.1%), respectively. This result indicates that more than half of the abortion cases occur in the third trimester.

The dairy cows under this study were all exotic (HF) breeds kept under the same management (intensive) system. But other risk factors such as parity of a cow and body condition score at calving were considered to assess its association with the occurrence of the reproductive problems. Accordingly, the possible impact of increasing parity on the occurrence of the post parturient reproductive problems was examined and there is a direct relationship of increasing parity and the prevalence of the post parturient reproductive problems with a highly significant ( $P < 0.01$ ) result (Table 1). The influence of body condition score at calving on the occurrence of the major post parturient reproductive problems was assessed (Table 1) and the result showed that there is an inverse relationship of body condition and prevalence of the post parturient reproductive problems. The variation in prevalence among the different body condition score was found statistically highly significant ( $P < 0.01$ ). Although an attempt was also made to see sanitation of farms as a possible cause of reproductive problems; this was not statistically significant ( $P > 0.05$ ).

Analysis of the result was also made to observe the relationship of clinical metritis cases with the other predisposing factors. The result showed that 7 (77.8%) of the clinical metritis were developed as a sequel to abortion, dystocia and RFM accounting for 3 (33.3%), 1 (11.1%) and 3 (33.3%) respectively. Only 2 (22.2%) of the total cases were developed after normal parturition.

The association of metritis with abortion, dystocia and RFM was tested statistically and it was found out that metritis was not significantly associated ( $P > 0.05$ ) with these predisposing factors (Table 2).

## **DISCUSSION**

The prevalence of anestrus observed in this study is in line with the results of Zewdu (1992) and Amene (2006) who reported a prevalence of 0.7 to 20.4%, and 10.2% in ILCA herds in Debre Zeit and at Alage dairy farm, respectively. This prevalence is lower than the range indicated by Befekadu (2007) and Darwo and Zerbini (1998) as 16.4 and 24% in cross bred dairy cows in Debre Zeit and in central high lands of Ethiopia, respectively. This might be due to the breed and management system differences. The 10.6% prevalence of repeat breeding found in this study agrees with the 5 to 15% reported by Puntam (1986), 9.6% reported by Amene (2006) and 13% reported by Micheal (2003). The higher repeat breeding cases recorded in pluriparous cows (63.6%) than those of primiparous (36.4%) is in agreement with the finding of Wolf (1993) who described the decline in fertility of cows with an increase in parity.

**Table 1.** Prevalence of prepartum and postpartum reproductive problems and its association with risk factors.

Risk factor	No. of cows examined	No. of cows with RP	No. of cows with normal parturition	Percent of affected cows	$\chi^2$ Value	DF	P-value
<b>Parity</b>							
Primiparous	31	17	14	54.8	8.88	1	0.003
Pluriparous	73	18	55	24.7			
Total	104	35	69	33.6			
<b>Sanitation</b>							
Good	70	20	50	28.6	2.48	1	0.116
Poor	34	15	19	44.1			
Total	104	35	69	33.6			
<b>BCS</b>							
0	3	2	1	66.7	18.72	5	.002
1	12	8	4	66.7			
2	28	14	14	50.0			
3	34	8	26	23.5			
4	22	3	19	13.6			
5	5	0	5	0			
Total	104	35	69	33.6			

**Table 2.** Association of clinical metritis with the other predisposing factors of cows in the selected farms.

Predisposing factors	Cases with clinical metritis	Cases without clinical metritis	Total
Abortion	3 (42.9)	4 (57.1)	7
Dystocia	1 (33.3)	2 (66.7)	3
RFM	3 (75.0)	1 (25.0)	4
Total	7 (50.0)	7 (50.0)	14

$\chi^2=1.48$ , DF=2, P>0.05.

The problem of repeat breeding could be possibly due to wrong time of heat detection and insemination as well as problems related to semen handling and insemination techniques (Robert, 1986).

Prevalence of metritis recorded in this study (8.7%) agrees with that of Micheal (2003) who reported a prevalence of 11.3%. However, a lower prevalence of metritis was obtained in this work compared to the results of Gebremariam (1996), Ebrahim (2003) and Amene (2006) who have reported 19.6, 18.7 and 28.5%, respectively. This could be possibly due to differences in breed and management systems. Another important clinical reproductive problem in this study was abortion, which accounted for 6.7%. This figure is similar to the results of Tekelye et al. (1991, 1992a), Zewdu (1992) and Gebremariam (1996) who have reported a prevalence of 1.7 to 20.2%, 1.0 to 8.4%, 1.5 to 7.8% and 6.1% in three state dairy farms in central high lands of Ethiopia, in indigenous cattle at Abornessa farm, in Debre Zeit ILCA herds and in extreme Northern Ethiopia, respectively.

This finding was also similar with the report of Awad et al. (1977) who obtained an abortion rate of 6.52% in Egypt. At Ghibe farm, Tekelye et al. (1992b) reported a prevalence of 2.6 and 2.0% in 1988 and 1989, respectively. This low abortion rate may be the effect of vaccination against brucellosis as it is indicated by the author.

The other results of reproductive problems considered in this study were 2.9% dystocia, 3.8% RFM and 1.9% prolapse which are lower when compared with most of the earlier reports. 2.9% prevalence of dystocia is in agreement with Zewdu (1992), Amene (2006) and Gebremariam (1996) who reported a prevalence of 2.2 to 4.4, 3.1 and 3.7%, respectively. But it is lower than the 9.7% reported by Micheal (2003) and 5.8% by Tadelech (2004) in small holder dairy cows in and around Awassa and Debre Zeit, respectively. This wide variation in the prevalence of dystocia is due to the fact that it is influenced by factors such as, the age and parity of the dam as well as breed of the sire as has been reported

earlier (Morrow, 1980; Noakes, 1986). The 3.8% prevalence of RFM is in line with the reports of Morrow (1980) and Paisley et al. (1986) who reported a morbidity range of 3 to 12% and 1.96 to 55%, respectively. But the prevalence of RFM in this study was lower than the reports of Tadelech (2004), Gebremariam (1996), Tekelye et al. (1992a), Amene (2006) and Ebrahim (2003) who reported 14.3, 16.8, 15.5, 26.6 and 7.1 to 28.9%, respectively. The lower prevalence of RFM in this study could be due to lower rate of dystocia and management difference especially feeding and sanitation.

Similar to the previous findings (Gebremariam, 1996; Melkamu, 1999; Desalegne, 2000; Micheal, 2003; Ebrahim, 2003; Tadelech, 2004), the present study confirms that pluriparous cows are more affected by postpartum reproductive problems than the primiparous. This might be possibly due to repeated exposure of pluriparous genital tract to environmental risk factors, which indeed, caused uterine infection. Moreover, in this study, the prevalence of post parturient reproductive problems had highly significant inverse relationship ( $P < 0.01$ ) with the body condition of the animals. The higher prevalence of reproductive problems found in animals of poor body condition may be attributed to the fact that such animals do have weak expulsive force to drop their after birth or to give birth without assistance which is followed by secondary complication. However, animals in good body condition have been reported to have better ability to meet the energy requirement of parturition, lactation and involution of uterus than a cow in poor body condition and hence, are better resistant to the possible infections that may be the result than a cow in poor body condition (Hafez, 1993).

Finally the association of metritis with the other reproductive problems (that is, abortion, dystocia and RFM) as a predisposing factors was not statistically significant ( $P > 0.05$ ). In fact, various authors (Bretzlaff et al., 1982; Markusfeld, 1984; Noakes, 1986; Paisley et al., 1986; Robert, 1986; Arthur et al., 1989; Barnouin and Chacornac, 1992; El-Din et al., 1995) all reported the presence of high degree of association between metritis and the aforementioned predisposing factors. In this study, 3 (75.0%) of the RFM cases develop metritis and additionally 7 (77.8%) of the metritis cases develop postpartum anestrus which is in agreement with that of Allenstein (1981) who indicated that RFM of long course is the main cause of metritis and metritis in turn has long been known to create anestrus condition in dairy cows.

## CONCLUSION AND RECOMMENDATIONS

The result of the present study indicated that postpartum anestrus and repeat breeding are the leading reproductive problems followed by metritis and abortion, respectively. In general, the prevalence of the major reproductive problems in the study farms is high beyond the economically tolerable limit. This might be accounted

to the poor management at calving, poor farm hygienic practices and lack of regular clinical follow up by animal health professional in the farms. Hence, improvement of hygienic condition of the farms and proper care, management and handling of cows at the time of parturition should be practiced. Routine and periodical examination of cows during postpartum period is essential, since most cows acquire uterine infection during this period.

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