



## Study On Major Reproductive Health Problem On Dairy Cattle In West Hararghe Zone, Eastern Ethiopia

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**Abstract:** A cross-sectional study was undertaken to identify the prevalence of major reproductive health problems of dairy cattle and its associated risk factors in selected sites of west Haraghe Zone (Oda Bultum, Chiro and Miesso) from January, 2017 to September, 2018 was conducted. A total of 137 respondents were interviewed in this study and the finding showed that the most frequent occurred problems are anestrus, repeat breeding, retained fetal membranes, prolapse, mastitis and abortion as responded by 25.5%, 21.4%, 19.1%, 17.8%, 11.2% and 5% of the interviewee respectively. Similarly a record of 396 dairy cows was examined to determine the reproductive health problems of dairy cattle and associated risk factors, and follow up study for their last three months (last trimester) was conducted on 17 pregnant cows simultaneous. From the total of 413 cows examined, 102 (24.7%) were having at least one of the reproductive problems identified by either retrospective (n=396) or regular follow up (n=17) of individual cows. The major reproductive health problems identified in the present study were retained fetal membrane (RFM, 8.23%, n=34/413), repeat breeding (6.05%, n=25/413), dystocia (3.39%, n=14/413), abortion (3.39%, n=14/413), prolapsed (1.94%, n=8/413) and anestrus (1.69%, n=7/413). The prevalence of reproductive problems revealed significant difference (p<0.05) with respect to age, breed, districts and parity of dairy cows while management system was not statistically significant (p>0.05) on the occurrence of the reproductive problems of cows. As laboratory results indicated that mastitis had great roles in reproductive health problems of dairy cows in the study area with prevalence rates of 21.1%, whereas the prevalence of brucellosis were 0.26%. Generally the current finding revealed that several reproductive health problems like: RFM, repeat breeding, dystocia and abortion are mostly prevalent in dairy cows in West Hararghe zone.

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### Introduction

The worldwide population of cattle is estimated to 1.4 billion animals, of which 54 million (3.68%) are found in Ethiopia. Which makes among the top five countries in the world regarding the cattle population with 54,000,000 heads (Cook, 2016). Livestock production plays a crucial role in Sub Saharan Africa for the economic development of the countries and living standard of rural communities by serving as source of income up to 85% GDP and food. As in many other countries, livestock plays multiple roles in Ethiopia being a major natural source of food, industrial raw materials, export earnings and form an integral part of agriculture production system (DACA, 2006).

Ethiopia is one of the few countries in the world with high livestock potential. However production efficiency of cattle is low in Ethiopia despite their

large population. Also; their productivity is low due to various constraints such as diseases, poor nutrition, poor management practices and low productive performance of the indigenous breeds (CSA, 2016).

High reproductive efficiency of cows is very important for achieving the maximum return from dairy farming. Any abnormality in reproductive system can interrupt animal production performance. Reproductive problems of dairy cows have multifactorial causes which related to reproductive management and ovarian and uterine health. The reproductive problems result in heavy economic losses and have been public health concern in dairy farms as well as the main causes of poor productive performance in smallholder dairy farms (Roberts, 1986; Bekena *et al.*, 1994, 1997; Arthur *et al.*, 1996). Among the major reproductive problems that have a direct impact on reproductive performance of dairy

cows are; retained fetal membrane (RFM), bovine brucellosis, repeated breeding, abortion, anoestrus, dystocia, endometritis, prolapsed (uterine and vaginal) and pyometra have been reported to be the most common economically important problems (Dinka, 2013; Hadush *et al.*, 2013; Haile *et al.*, 2014). These problems could also be classified as before gestation (anoestrous and repeat breeding), during gestation (abortion, vagina prolapsed) or delivery dystocia and after gestation (RFM and uterine prolapsed). The impaired function of the reproductive system results failure of a cow to produce a calf yearly and regularly (Arthur *et al.*, 1989; Hoojjar *et al.*, 1999; Shiferaw *et al.*, 2005; Lobago *et al.*, 2006).

Bovine brucellosis is common genital disease in animals and has public health problem, which causing a serious economic loss in animal production and deterioration of public health (Arthur *et al.*, 1996; Richey and Dix Harrell, 1997; Moti *et al.*, 2012). In Sub-Saharan Africa, the seroprevalence of brucella infections in cattle populations has been shown to range from 0.3% to 45% (Makita *et al.*, 2008; Mangen *et al.*, 2002; McDermott and Arimi, 2002). According to the available data, brucella sero-prevalence has been reported different part of Ethiopia. Such as, Dinka and Chala (2009) investigated bovine brucellosis using RBPT in four districts of East Showa Zone 8.7%, 18.6%, 5.1% & 10% of the samples in Fentale, Arsi Negele, Lume and Adami Tulu study districts, respectively. The overall herd prevalence was reported to be 11.2%. Jergefa *et al.* (2009) in three agro ecological areas of central Oromiya by using RBPT and CFT. In general accordingly to region-based meta-analysis, forest plot revealed the highest prevalence in central Ethiopia followed by the southern part. The lowest prevalence estimate was observed in the western part of the country (Asmare *et al.*, 2014).

The different types reproductive health problems of dairy cattle can reduce the reproductive performance of the dairy cattle. This problem makes 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 (Lobago *et al.*, 2006; Gizaw *et al.*, 2007). Some studies conducted in different parts of Ethiopia indicated that 26.5% of cows examined had at least one of reproductive problems in and around Bedelle south west Ethiopia (Bitew and Shiv, 2011), and retrospective analysis of clinical data in central Ethiopia showed 44.3% of the cows had major parturition and postpartum reproductive problems (Hadush *et al.*, 2013). Gashaw *et al.* (2011) and Dawit and Ahmed (2013) also reported the prevalence of 33.59% and 40.25% of reproductive health problems

of cows in Jimma town, South-west Ethiopia and Kombolcha, North-east Ethiopia, respectively.

Major reproductive disorders in crossbred dairy cows in different locations around Addis Ababa milk shed were 75.3%, 60.1%, 58.1% and 75.15% in Addis Ababa, Holleta, Debrezeit and Sululta, and Muka turi, respectively (Haile *et al.*, 2010).

So such research is not well documented in West Hararghe zone even not in eastern parts of Ethiopia. However, most reports made thus far have either limited geographic coverage or are relatively confined to a single agro-ecology. This warrants the need for a comprehensive understanding of disease occurrence in dairy production systems and spatial distribution across the country, as this help to shape possible future intervention programmes.

Although major reproductive disorders are attributed to high economic loss in dairy cattle, no investigation has been done on the presence and risk factors of reproductive problems of dairy cattle in selected sites of West Hararghe zone of Oromia region, eastern Ethiopia, which gave impetus to the initiation of this study. Therefore, the objective of the study are:

- ✓ To identify the major reproductive health problems of dairy cattle and its associated risk factors for the occurrence of the problems.
- ✓ To forward possible recommendations for the prevention and control approaches.

## Materials And Methods

### Description of the Study Area

West hararghe zone is located to the eastern part of Ethiopia and Oromia 317 km far from Addis Ababa (CSA, 2007). The study area is located between 7° 52' 15'' - 9° 28' 43'' N latitude and 40° 03' 33'' - 40° 34' 13'' E longitude with an altitude of 1200-3600m above sea level. It is also characterized by three agro-climatic zones, namely highland (Dega), midland (WeinaDega) and lowland (Kola). Kola takes more percentage 49.51%, Dega covers 12.49%, WeinaDega 38%. There are two rainy seasons: *ganna* (June-September) and *belgi/badhesa* (February-April). The mean annual rain fall of the area is from 650-1500 mm and average temperature 20.5-24°C (WHZANRO, 2016). Out of 17 districts of the zone, three (namely Oda Bultum, Chiro and Meisso) selected purposely for the present study. The study zone has a total of 17 districts, from which 4 are pastoralist districts (Census, 2007). A survey of the land in west Hararghe (released in 2016) shows that 372,615 hectare is cultivation land, 132,615 hectare is forest land, 3362 hectare is marshy land, 64,665 hectare bush land, 414,217 hectare is grazing land, 65,700 hectare is for social service and 366,981 hectare is degraded land. Livestock are important component of the prevailing crop-livestock

mixed farming systems of the study Zone. Small holder farmers of the study area owned various livestock species such as cattle, sheep, goat, chicken, Camel and equines. The study zone has a total

population of 1,017,806 cattle, 182,149 sheep, 890,226 goats, 216,819 donkeys, 1,102 mules, 1,512,784 chicken, 40,337 camels and 65,846 bee hives (CSA, 2016).

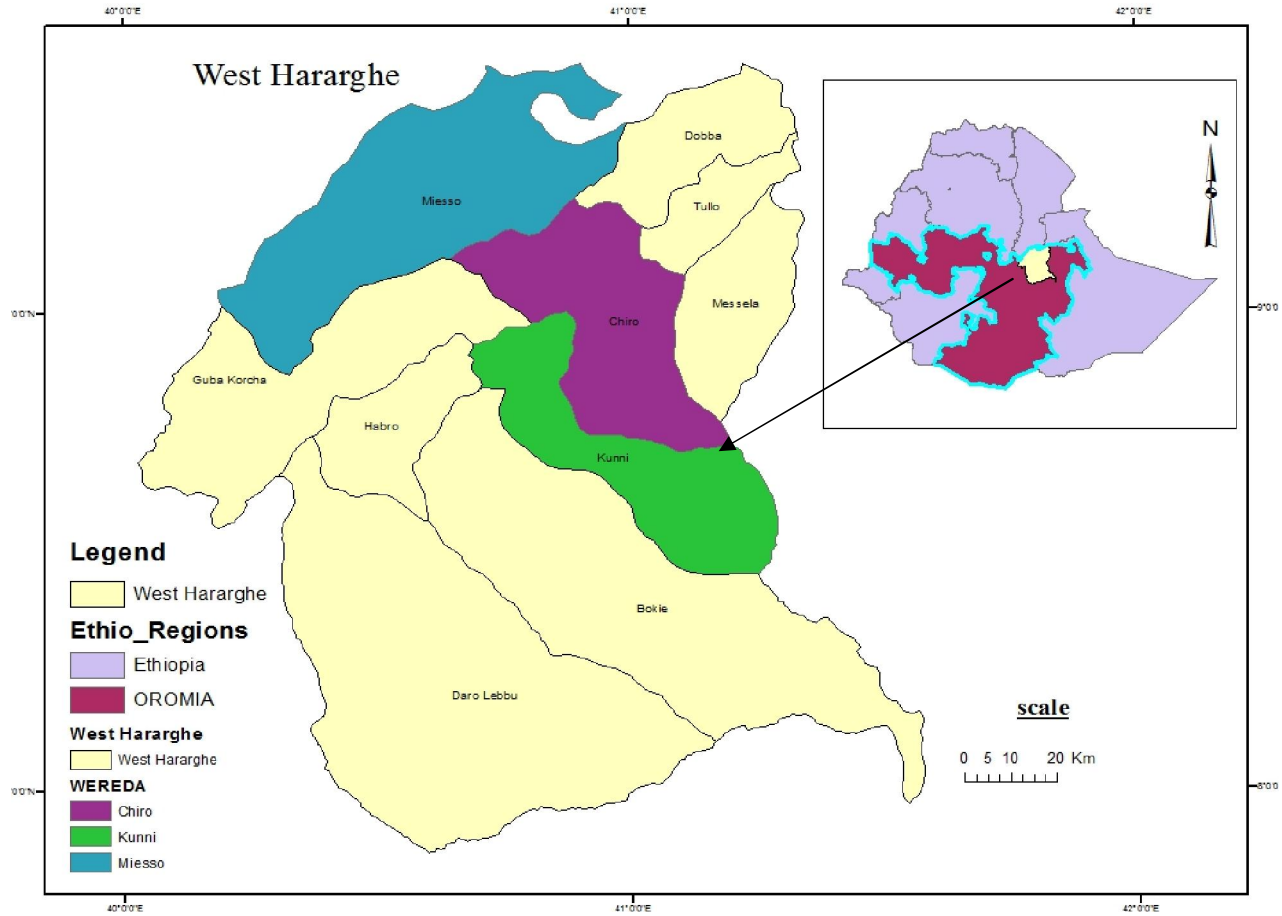


Figure 1: Map of the Study Area.

### Study Methodology and Design

Cross-sectional type of study was undertaken from January, 2017 to September, 2018 which included three selected district (Oda Bultum, Chiro and Miesso) based on dairy cattle population potential and accessibility, to determine the major reproductive problems of dairy cattle and the study employed questionnaire, retrospective study and regular follow up. Households possessing at least one dairy cow in selected districts and cattle owned by these households represent the study population.

Secondary data of 396 cattle was collected from the recorded books kept by animal health office during treatment and prevention taken on farmer's case in the last three years; from January, 2015 up to December, 2017 was collected to determine major reproductive problems and assess associated risk factor of the dairy cows in the study area. Heifer that has age of 3 year and above was included in the study.

A total of 137 owners and/or attendants of cattle were randomly selected and interviewed using structured questionnaire, to collect information regarding major reproductive health problems encountered the dairy cattle such as abortion, dystocia, retained fetal membrane, prolepses (uterine/vaginal), repeat breeding and anestrus. The questioner was prepared in English and interpreted whenever it was required. Prior to interview the objective of the study was clearly expressed to the owners so as to obtain real information about their animals. For survey data collection group discussion was undertaken with key informants such as elders and zonal and district livestock development bureau staff to investigate and have an overview about the reproductive health problems of dairy cattle. A rapid field survey was conducted before the main survey work to know the distribution reproductive health problem of dairy cattle in the rural households. Enumerators were selected

and trained from the animal health technician of the agricultural office of the administration. Finally the formal survey was conducted by enumerators under close supervision. From a total of 109 peasant associations of three district (PAs; 41 PAs of Chiro, 37 PAs of Oda Bultum, 31 PAs of Miesso), 4 PAs were selected purposively from each district based on dairy cattle population, accessibility of the PAs area coverage, livestock population owned in those PAs and representativeness for the study areas. Simple random sampling procedure was used to select representative herds or households for the study.

#### Sample Size Determination and Sampling Method

The sample size required for this study was determined depending on the expected prevalence of reproductive problems and the desired absolute precision by the formula given by Thrusfield (2007). Therefore, using 95% confidence interval, 5% precision and 50% expected prevalence, the number of cows needed to demonstrate the prevalence of reproductive health problems in West hararghe zone were 384 dairy cows. Simple random sampling was used to sample individual animals from selected herds of PA based on composition of livestock population.

P= Expected prevalence

D= Desired level of precision (5%)

N= Sample size

Therefore,

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

$$= \frac{(1.96)^2 0.5(1-0.5)}{0.05^2}$$

$$= \underline{384} \text{ Animals}$$

#### Data Collection

In questionnaire survey, observations were made, and questions were asked about major reproductive problems like abortion, dystocia, retained fetal membrane, uterine and vaginal prolapse, anestrus and repeat breeding, as described in the study of Hadush *et al.* (2013); and secondary data were included to know factors associated with reproductive health problems in dairy cows.

**Abortion, dystocia, RFM, Anestrus, repeat breeding and uterine or vaginal prolapse:** Abortion is expulsion of dead fetus of recognizable size before full term of the gestation period is termed as abortion. Dystocia is an abnormal and difficult birth in which the first or specially the second stage of parturition was markedly prolonged and subsequently found impossible for the dam to deliver without artificial aid. RFM is the lack of expulsion of the fetal membranes within the first 24h after calving. Anestrus is a state of complete sexual inactivity with no manifestation of

estrus for more than two months. A cow or a heifer that failed to conceive for three or more consecutive services was termed as repeat breeding. Uterine or vaginal prolapse is the coming out of the uterus or vagina through the vulva after parturition. Regular follow up was undertaken on 17 pregnant cows, which were purposively selected at last months of their pregnancy and regularly followed for any reproductive problems encountered by owners and clinical examination by professionals. These pregnant cows were subjected to different clinical and gynaecological examinations and findings were recorded once a week.

**Serology test:** At Hirna regional laboratory, West hararghe, Ethiopia, the rose bengal plate test (RBPT) was employed as a screening test on the serum samples for the presence of brucella agglutinins and the degree of positivity was recorded using agglutinations observed during the test of sera using RBPT. The test serum and antigen was left at room temperature for half an hour before the test; 30µl of RBPT antigen and 30µl of test serum was placed alongside on plate, and then mix thoroughly. The plate was shaken for 4 min and the degree of agglutination reactions were recorded. The samples were considered as positive if any agglutination was observed and negative if no agglutination. Sampling procedure:- About 10 ml of blood sample was collected from the jugular vein of each cattle using plain vacutainer tubes. The blood was left at room temperature for 24 hours and serum was harvested using cryovials and each cryovials containing the serum was labeled. The collected serum sample was stored at -20°C until tested by RBPT.

**Mastitis test (CMT)** was performed immediately at the time of sample taken from animals to detect percent positivity of mastitis, milk samples collected aseptically from each quarter of lactating cows based on the method described by Quinn *et al.* (2004). If at least one quarter was found positive by the CMT, then the cow was considered positive.

#### Data Management and Analysis

The data were entered and managed in Microsoft Excel. Qualitative data derived from direct observations and key informants were examined and presented in the form of discussions.

#### Results

The present study result showed that respondents having of different age groups with the maximum age of 75 and minimum age of 28 years were included. Out of 137 respondents, 74.5% of them were males and 25.5% females. With regard to educational status, among the respondents 78% had not received education, while 17.6% were attended from grade 1 to grade 7. More specifically, 2.9% and 1.5% of the respondents had attended from grade 8-12 and greater



than grade12 respectively. The respondents reported 68.2% from rural area and 28.5% from pre-urban area and 3.3% from urban area were included in the selected sites of the study areas. Respondents were also interviewed to describe the occurrence of reproductive problems in dairy cattle and showed 25.5% anoestrus, 21.4% repeat breeding, 19.1% retained fetal membranes, 17.8% prolapse (vaginal and uerine), 11. 2% mastitis and 5% abortion.

In the retrospective study, from a total of 396 assessed recorded data on pregnant and parturient cows from 2015 to 2017, 24.2% (n=96) were found with major reproductive problems in selected study area. In the regular follow up study using a total of 17 cows, of which 6 (35.3%) were found to have reproductive problem. In the recent study, the reproductive health problems based on the retrospective study and regular follow up in the study area is presented in Table 1.

Table 1: The reproductive health problems based on retrospective study and regular follow up.

Method of study	No. of cows examined	No. of cows with reproductive Problems (%)
Retrospective study	396	96 (24.2%)
Regular follow up	17	6 (35.3%)
Total	413	102 (24.7%)

In this study (including retrospective study and regular follow up), RFM (8.23%), repeat breeding (6.05%), dystocia (3.39%), abortion (3.39%),

prolapsed (1.94%) and anestrus (1.69%) were found to be the major reproductive problems identified as summarized on table 2 below.

Table 2: Prevalence of reproductive health problems of dairy cattle in the study area (retrospective study and clinical follow up )

Reproductive health problems	Retrospective (N=396)	study Clinical (N=17)	follow up Overall prevalence (N=413)
RFMs	31 (7.82%)	3 (17.65%)	34 (8.23%)
Repeat breeder	25 (6.31%)	0 (0.00%)	25 (6.05%)
Dystocia	12 (3.03%)	2 (11.76%)	14 (3.39%)
Abortion	13 (3.28%)	1 (5.88%)	14 (3.39)
Prolapse	8 (2.02%)	0 (0.00%)	8 (1.94%)
Anestrus	7 (1.77%)	0 (0.00%)	7 (1.69%)
Total	96 (24.24%)	6 (35.29%)	102 (24.69%)

RFM=Retained Fetal Membrane, N= number of animal included.

In this study, the risk factors such as age, parity, breed, management, selected district were assessed and their association risk factors with reproductive problems were summarized on the tables below. The study revealed the influences of age, parity, breed, management and selected district in the occurrence of reproductive problems. Age, breed, district and parity were highly statistically significant with ( $p < 0.05$ ) while management was not statistically significant ( $p > 0.05$ ). Total animal founded in Oda Bultum district were 114, out of these 39.47% (45/114) animals had reproductive problems, 137 animals were founded in Meisso district, out of these 39.9% (29/137) animals

had reproductive problem, 145 animals founded in Chiro district, out of these 15.2% ( 22/145) animals had reproductive problem.

In this study, age showed variations in reproductive problems among 3-4 years, 5-9 years and >9 years with the prevalence of 10.1%, 22.9% and 49.2% respectively. The prevalence rate of reproductive problems, with cross breeds more susceptible (31.8%) than local breed cows (20.5%). The prevalence of reproductive health problems in primiparous (15.9%) is lower than the pluriparous (25.8%) in present study area (Table 3).

Table 3: Prevalence and association risk factors with major reproductive health problems.

Animal factors	No animals	No positive	prevalence	$\chi^2$	P-value
District					
Oda Bultum	114	45	39.47%	21.6	0.000
Miesso	137	29	26.85%		
Chiro	145	22	15.17%		
Total	396	96	24.24%		

Age					
3-4 years	79	8	10.1%	28.77	0.000
5-9 years	258	59	22.9%		
>9years	59	29	49.2%		
Total	396	96	24.24%		
Breed					
Local	264	54	20.5%	5,58	0.018
Cross	132	42	31.8%		
Total	396	96	24.24%		
Parity number					
Primiparas	63	10	15.9%	8.01	0.004
Pluriparas	333	86	25.8%		
Total	396	96	24.24%		
Management					
Extensive	302	77	25.5%	0.82	0.345
Intensive	94	19	20.2%		
Total	396	96	24.24%		

In the recent study, the sero-prevalence distribution of brucella infection and mastitis in the study area is presented in (Table 4). Among 384 dairy cattle tested for bovine brucellosis, 0.26% were tested

positive for brucella antibody by RBPT. While dairy cattle tested for mastitis, 21.1% were tested positive by CMT were summarized in the following Table 4.

Table 4: The result of brucellosis and mastitis using RBPT and CMT in the laboratory respectively.

Disease type	Test conducted	No. of cows examined	Positive cases (%)
Mastitis	CMT	384	81 (21.1)
Brucellosis	RBPT	384	2 (0.26)

\*Rose Bengal Plate Test (RBPT), California Mastitis Test (CMT).

## Discussion

The educational status attained by majority of the respondents was low, this agreement to this study, Asaminew and Eyassu (2009) reported low educational level of households in Bahir Dar, North western Ethiopia. This low level of educational status may lead to reduced production of dairy farms because of low use of dairy innovations such as cultivation of improved forages, breeding techniques and use of modern dairy farming in the study area. The present findings using the questionnaire survey in this study revealed the occurrence of the major reproductive problems were mainly anoestrus, repeat breeding, RFM and abortion.

The retrospective study (N=396) and regular follow up (N=17) revealed that a total of 413 animals included of which 102 (24.7%) of dairy cattle in the study areas were affected with either one or more reproductive disorders, from which 39.47%, 15.17% and 26.58% prevalence of reproductive disease were in Oda Bultum, Chiro and Miesso district respectively. In this study (regular follow up), RFM, dystocia and abortion, were found to be the major reproductive health problems containing 17.65%, 11.76% and 5.88% respectively.

The present study indicated overall prevalence of reproductive health problems of cows in selected study

area is 24.7%. This was relatively in agreement with the report of Molalegne and Shiv (2011), who reported 26.5% of reproductive problems in a study in and around Bedelle, south west Ethiopia. However, lower prevalence was recorded in the present study as compared to the findings of Gizaw *et al.* (2007), Gashaw *et al.* (2011), and Dawit and Ahmed (2013), who reported the prevalence as 31.76%, 33.59% and 40.25%, respectively in different parts of Ethiopia. This variation in prevalence might be due to differences in environmental factors, breeds of the animals and variation in management system between the different areas of the studies.

The current study (including retrospective study and regular follow up) identifies RFM (8.23%), repeat breeding (6.05%), dystocia (3.39%), abortion (3.39%), prolapsed (1.94%) and anestrus (1.69%) were found to be the reproductive health problems of study area. RFM was one of the major reproductive health problems identified in the present study with a prevalence rate of 8.23%. This was relatively agree with the study of Zewdu (1992) and Tekely *et al.*, (1991), who reported prevalence of 8.1-12.5% in Bushoftu and 7.1-9.8% respectively. However, prevalence in this study area was lower than the findings of Haile *et al.* (2010), Degefa *et al.* (2011) and Gashaw *et al.* (2011), who reported 17%, 18.3%

and 19.2% respectively from different part of Ethiopia. The variation in the prevalence of RFM may be attributed to the difference in nutritional status and management factors. Uterine paresis, abortion, stress, late or premature birth, dystocia, twinning, infections, seasonal and hormonal disorders, immune-suppression vitamin and mineral deficiencies have been identified as causes of RFM (Joosten, 1987; Akar and Yeldiz, 2005; Lotthammer, 2005; Beagley *et al.*, 2010).

The prevalence of repeat breeding in the present study (6.05%) is in fairly agreement with the findings of Haile *et al.* (2010) and Mesafint and Guesh (2014), who reported the prevalence of the problem as 6.2% and 7.29% respectively. When compared with the findings of Bitew and Shiv (2011), Gashaw *et al.* (2011), and Dawit and Ahmed (2013), who reported prevalence's of 3%, 1.3% and 3.87% respectively, a higher prevalence rate of repeat breeding was obtained in the current study. But it is lower than when compared with the findings of Dinka (2013), Esheti and Moges (2014) and Haile *et al.* (2014), who reported prevalence of 26.8%, 15.9% and 13.8%, respectively. Repeat 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 (Haftu and Gashaw, 2009).

The prevalence rate of dystocia in current study (3.39%) is in agreement with study of Zewdu (1992), Gebremariam (1996) and Ebrahim (2003), who reported 2.2-4.4%, 3.7%, and 4.3% respectively from different part of Ethiopia. But prevalence in this study area lower than the finding of Tigre (2004), Tadesse (1999) and Kassahun (2003), who reported 7.5% 7.8% and 9.65% respectively from different part of Ethiopia. This variation in the occurrence of dystocia may be due to the fact that it is influenced by factors such as age and parity number; as well as breed of the sire (Morrow, 1986; Noakes, 1986). Inseminating cows with semen collected from large sized bulls without considering the size and age of cows is an important factor in the development of dystocia.

The prevalence rate of abortion recorded in the present study was 3.39% which is fairly consistent with the finding of Ebrahim (2003), who reported 3.19% in and around Kombolcha, Gizaw *et al.* (2007), who reported 2.23% and Haile *et al.* (2014), who reported 2.56%.

On the other hand, Bitew and Shiv (2011), Degefa *et al.* (2011), Dinka (2013) and, Benti and Zewdie (2014) reported 13.9%, 8.7%, 14.6% and 12.2%, respectively which are higher than the current

finding, but compared with the finding of Gashaw *et al.* (2011) who reported prevalence rate of 1% the present finding is higher. The lower prevalence rate of abortion may be attributed to the low prevalence of brucellosis in the area and increasing practice of AI (Artificial Insemination) techniques in the area. The difference in prevalence of abortion may be due to variation in practice of AI, genetic, nutritional status, infection, level of toxicities and husbandry management system in different areas. When the incidence of abortion is 2% or more it should be diagnosed soon to know its cause and viewed seriously (Roberts, 1986).

Attention was also given for the prevalence rate of prolapses (uterine or vaginal) in current study area and found that 1.94% prolapse. These were fairly agrees with the finding of Tadesse (1999), who reported 1.9%. On the other hand, Kidusan (2009), who reported 5.2% which is higher than the current finding, but compared with the finding of Dawite and Ahmed (2013) who reported the incidence rate of 1.2%, the present finding is higher. The probable causes of low prevalence rate of prolapses in study area may be due to reduced effect of predisposing factors like excessive traction of the fetus to relief dystocia or retained fetal membranes.

In the current study anoestrus was found with prevalence rate of 1.69%. These were agree with the finding of Bitew and Shiv (2011) who reported 1.7%. Previous reports of the prevalence of anoestrus of 10.1% by Haile *et al.* (2010), 10.26% by Haile *et al.* (2014) and 10.3% by Benti and Zewdie (2014) are higher than the current finding. The difference observed in the prevalence rate of anoestrus could be due to difference in heat detection practice and management system particularly nutritional variation in animals.

The studied district which is the origin of animals have a significant effect on prevalence of the reproductive problems ( $p < 0.05$ ).

Analysis of the prevalence of major reproductive problems revealed that age had statistically significant association and a highest (49.2%) prevalence rate of major reproductive problem was obtained in age  $>9$  years cows as compare with the prevalence of 3-4 years (10.1%) and 5-9 years (22.9%). This is because of as the animals aged, their immunity to overcome disease condition became decrease.

The prevalence rate of reproductive problems in crossbred animals (31.8%) higher than local breed (20.5%), this is due to the fact that exotic blood breeds are less adapted to tropical conditions of high temperature and humidity, disease and low feed quality than zebu cattle, making them more susceptible than indigenous zebu (Mukasa-Mugerwa, 1989). Another reason may also be due to the fact that,

cross breeds require more elaborated management, feeding and better health care than the indigenous zebu to get better reproductive performance and productivity in the tropics (Tekelye *et al.*, 1991).

The significantly higher occurrence of reproductive health problems observed in pluriparas cows (25.8%) than primiparas (15.9%) with the p-value < 0.005. In this work is similar to the previous findings, which is possibly due to the repeated exposure of the genital tract of pluriparas cows to environmental risk factors that can impart uterine infection (Mamo, 2004). Longer recovery time from pregnancy, lactation stress and the low feed intake capacity of the older cows could also be other reasons for this variation. However, there was no significant association between different management systems ( $P > 0.05$ ) of cows.

Based on laboratory findings, brucellosis had low prevalence (0.26%) and mastitis had great roles in dairy cows' reproductive health problems of the study area with the prevalence of 21.1% (Table 4). The present study on the prevalence of rate of bovine brucellosis in the selected sites of West Hararge region was 0.26%. This very low prevalence was in agreement with previous and recent reports done using RBPT by Bishatu *et al.* (2015) who reported 0.2% in Ambo and 0.7% in Debrebrhan, Tolosa (2004) which reported prevalence rate of 0.94% in selected sites of Jimma zone, Asmare *et al.* (2010) reported 0.0% in Arroresa district of Sidama zone in Southern Region, Asmare *et al.* (2014) reported 0.0% in Mekelle and Gondar of Northern Ethiopia and in Nazeret of Central Ethiopia, and Degefa *et al.* (2011) which reported 0.05% in Arsi zone.

On the contrary, many other previous bovine brucellosis studies in different parts of the country reported a high prevalence rate using RBPT, 14.14% in Assela by Deselegn and Gangwar (2011), 3% by Alemu *et al.* (2014) in Debrezeit. The lowest occurrence of the disease in the current study area could be due to increased awareness of farmers on use of AI, presence of trained animal health professionals as well as AI technicians in the areas of study, their good access to veterinary and extension services.

The prevalence of mastitis in this study area (21.1%) was comparable with the reported 24.9% by Tolla (1996) in Sellale, Northern Showa area. However, the result of this study much lesser than the report of Sori *et al.* (2005), Bedane *et al.* (2012b) and Lemma *et al.* (2001) in different parts of Ethiopia. This variation was due to difference in breed considered, management of cows and its environment as well as awareness level of communities on disease of mastitis in the study area. Therefore, further investigation is required on the root cause of reproductive health problems of cows and awareness

creation to communities on its control and prevention of the problems in the study area.

### Conclusion And Recommendations

This study revealed that reproductive health problems such as retained fetal membrane (RFM), repeat breeder, dystocia, abortion, prolapses (uterine or vaginal) and anoestrus affect the reproductive performance of the dairy cows. Hence, in the present investigation, the observation of a considerably higher prevalence of reproductive problems (especially, RFM, repeat breeding, dystocia and abortion) recorded and the occurrence of the associated risk factors (like breed, age, management and parity) generally indicate the importance of management related constraints for profitable production of dairy cattle in study area. Consequently based on the above conclusion, the following recommendations are forwarded:

- Veterinarians, communities and government should co-operate on prevention and control of the occurrence of major reproductive health problems by controlling predisposing factors.

- Good management (that is, improving animal feed, housing system, keeping farm hygiene, and close observation for animals in heat) should be experienced in small holding dairy farms.

- Appropriate health care (that is, infected animals should be treated well and animals at risk should be vaccinated against diseases like brucellosis to reduce prevalence rate of abortion and others) should be maintained in the study area.

- Small holder dairy producers should be aware of the impact of reproductive problems (on animal health, on the economy and public health), should be trained for better animal managements.

- Further detailed investigations on the various reproductive health problems in this area should be conducted to design control strategy.

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**Authors' contributions** Umer Seid: Contributed to conception of the research idea, designing and data collection, data analysis, interpretation of data, writing and editing of the manuscript. Yesihak Yusuf: Contributed to the study concept, interpretation of data, editing or reviewing of the manuscript. Muner Ahmadnurer Ahmednur: Contributed to conception of the research idea and conducted laboratory analysis. All authors read and approved the final manuscript.

**Ethics approval** and consent to participate Ethical approval and consent for this study was obtained from Oda Bultum University Minutes of



Animal Research Ethics and Review committee. Verbal consent was also obtained from the farm managers and owner to take samples from their cattle and for further research use of the samples.

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