Analysis of Lactation, Reproductive Performance and Disorders of Dairy Cows in Waliso and Ilu Districts Oromia, Ethiopia

Abera Fekata Dinkissa [1] , Ulfina Galmessa Girgo [2]

[1] Department of Animal and Range science, Bule Hora University, Bule Hora, Ethiopia

[2] Ethiopian Institute of Agricultural Research (EIAR), Holeta, Ethiopia.

[1]Corresponding author: fekataabera@gmail.com

Abstract

The aim of this study was to assess the lactation, reproductive performance, and disorders of dairy cows in Waliso and Ilu districts. A total of 122 respondents who participated in the production of dairy cattle were chosen at random and proportional to their size. The collected data were analyzed using Statistical Package for Social Sciences (SPSS) version20. Descriptive statistics were used to summarize the results such as overall means, standard error (SE), graphs, tables, frequency, and percentage. Daily milk yield of local breed cow was1.890±0.05liters/per/cow/day, while cross breed dairy cows7.410±0.31liters/cow/day. Cross breed dairy cows produced (1978.4597±0.98) liters/ lactation/cow and native breed cows produced (429.78±17.10) liters /lactation/cow on average. Results showed that local and cross breed dairy cows had lactations length of 7.58±0.05 and 8.90±0.29 months per lactation per year. The average reproductive performance of local and cross breed dairy cows was (AFS) 44.88±0.57and 24.43±0.29 months, (AFC)53.94±0.56and 33.43±0.29 months, (CI)14.35±0.41) and 14.35±0.41months, (DO)161±0.41 and 140±0.49) days, and (NSPC)1.69±0.06 and1.70±0.10 times, respectively. Daily milk yields, average milk yields, and lactation lengths were significantly (P0.05) different between the two Districts. The overall percentages of stillbirths, dystocia, retained fetal membranes, abortions, and mastitis were 8%, 6.35 %, 6.66 %, 12.15 %, and 11.8%, respectively. In inclusion, it could be concluded that the productive lactation, reproductive performance and disorder are relatively low. Thus, indicating that it is an urgent need for well-coordinated efforts of all concerned bodies to boost the productive and reproductive performance there by enhances the livelihood of the dairy farmers.

Introduction

Ethiopia is one of the countries in Sub-Saharan Africa with considerable cattle-producing potential. The country is ranked first in Africa and ninth worldwide by possessing a cattle population. The total cattle population for the country is estimated to be about 70 million. Out of this total cattle population, the female cattle constitute about 56 percent and the remaining 44 percent are male cattle. The average daily milk yield is 1.48 liters/cow/day and the average lactation length per cow is estimated to be seven months. The total annual milk production in Ethiopia is 7.123 billion (CSA, 2021).

The expansion of dairy production in Ethiopia has the potential to considerably reduce poverty and improve the health and nutritional quality of the entire community (Jan *et al*., 2010).Cattle production serves a multi-purpose role, providing milk, meat, fertilizer, fuel, draft power, and economic uplift through the sale of milk and milk products. The sector accounts for 15 to 17 percent of the total GDP (Behnke and Metaferia, 2011).

Despite having Africa's largest cattle population, a favorable climate, and a potentially large market, Ethiopia's contribution of cattle to income and nutrition has remained very limited (FAO, 2007). This is due to a variety of factors, including the low genetic capacity of indigenous cattle, the poor genetic potential for productive traits, substandard feeding, poor health care, and poor management practices (Duguma *et al.,* 2012; Ulfina *et al.,* 2013).

Currently, the estimated average per capita milk consumption in Ethiopia is only 20 liters per year per person. This compares to the African average of 40 liters per year and a world average of 105 liters per year (Brasesco *et al.*, 2019). The most accurate indicator of a cow's reproductive effectiveness is the Calving Interval. The calving interval of local cattle is estimated to be between 12.2 and 26.6 months (Mukasa-Mugerwa *et al.*, 1989). Long calving intervals have been linked to low nutritional status, bad breeding management, a lack of own bull and artificial insemination service, longer days open, diseases, and poor management methods (Duguma *et al.*, 2012). The Feed has an impact on cattle production and reproduction, and inadequate health care and management methods are the main causes of low productivity (Zegeye, 2003).

A dairy cow should calve initially at two years of age and then every 12 months until she is culled to produce the most progeny during her lifetime in a herd (Mukasa-Mugerwa *et al.,* 1989). This schedule will also maximize the amount of milk she produces each day of her life. Using superior sires through artificial insemination (AI) paired with estrus synchronization is one of the most successful strategies to improve both reproductive and genetic performance (Million *et al.*, 2011).

The dairy sector loses a lot of money because of reproductive health issues. Slower uterine involution, longer inter-conception and calving intervals, unfavorable effects on fertility, increased medication costs, decreased milk output, and early depreciation of potentially viable cows are all contributing factors (Lobago *et al.,* 2006; Gizaw *et al.*, 2007).

In poor and good physical condition, there is a higher prevalence of reproductive health problems than in medium physical condition (Gashaw *et al*., 2011). To this effect, the production and reproductive performance of dairy cows in conjunction with reproductive disorders, notably in the south west Shoa zone in the Ilu and Waliso districts, is unknown and has never been studied or reported. As a result, the current study aims to look into dairy output and reproductive performance in the study area, as well as reproductive disorders.

Materials and Methods

Ethical Approval

Experimental animal: all applicable national and international guidelines for the care and use of animals were followed.

Detailed Descriptions of the Research Area

The research was carried out in the Waliso and Ilu districts of Oromia regional state, Ethiopia, which are approximately 114 kilometers from Ethiopia's capital city, Addis Ababa, on the Jima main road heading south, with the same agro-ecology but distinct management practices. The study was conducted in two districts of the South West Shoa Zone, which were purposefully chosen based on their dairy production potential, accessibility, and distance from the Zonal center.

Ilu District

The district is 59 kilometers from the Zonal town of Waliso. Ilu district is located between 2060 and 2100 meters above sea level and receives 700-800 millimeters of

annual rainfall, with mean minimum and maximum yearly temperatures of 15°C and 25°C, respectively. The district has a total land area of 37,294 hectares, with 29,101 hectares of crop land, 100 hectares of pasture land, 400 hectares of vegetative land, and 3,134 hectares of building land. Ilu District only has a single agro-ecology, which is entirely midland. There were 61,004 cattle in the districts, according to estimates.

Waliso district

The district is in the zone capital city and is around 114 kilometers from Addis Ababa. The Waliso district is located between 1850 and 2800 meters above sea level, with an average annual rainfall of 1600 mm and mean minimum and maximum annual temperatures of 15°C and 24°C, respectively. The district spans 78,366 hectares, with 38,524 hectares of cropland, 3565 hectares of grazing land, 7613 hectares of common grazing space, 4,879 hectares of vegetation, 5513 hectares of forest land, and 15,820 hectares of buildings. It consists of 37 kebeles and two agro-ecological zones: 30% high land and 70% mid land. In the districts, the estimated cow population was 224,334 animals.

Household Selection and Sampling Techniques

The two districts were chosen for their accessibility to found dairy production potential and distance from the capital. Proportional random sampling procedures were used to choose the number of kebeles and households from both districts. The sampled respondent households were chosen at random based on the fraction of households that own milking cows. Two kebeles from Ilu District, Alango Tulu (18) and Bill (20), and four from Waliso District, Obi koji (34), Dambali keta (14), Badessa Koricha (27) and Tombe Ancabi (10) were chosen from the same agro-ecology, which is midland in both districts. To compare the significance of differences in dairy production and reproductive performance under various management approaches, as well as the effect of distance from the zonal town on extension activity .In general, 122 farmers (38 from Ilu and 84 from Waliso) who possess at least one lactating dairy cow, either native or cross breed, were randomly selected and interviewed from those kebeles With a 92% confidence level, the sample size was calculated using the Yamane formula (1967) for homogeneous experimental material.

$$n = \frac{N}{1+N(e)^2}$$

Where

n=designates the sample size

N=designates total number of households who own at least one lactating cows

e= designates maximum variability or margin of, error =8% (0.08)

1=designates the probability of the event occurring

$$n = \frac{N}{1+N(e)^2} = \frac{571}{1+571(0.0064)} = 122$$

Data Collecting Sources and Methods

Primary data from dairy lactation, reproductive performance and disorders parameters such as average daily milk yield, lactation length (LL), lactation milk yield and age at first service (AFS), age at first calving (AFC), calving interval (CI) and a number of serves per conception (NSPC) and reproductive disorders such as stillbirth, dystocia, retained placenta, and abortion were collected using semi-structured questionnaires. Zonal, livestock, and fisheries Resource Development offices provided secondary statistics such as cattle population, grazing land, temperature, and yearly rainfall.

Focus Group Discussions and Key Informant Interview

Focus group discussions (10-14 people) were held to discuss dairy producers' understanding of milk production, reproductive performance, and reproductive disorders. Participants in each group were given an overview of the study's goal and invited to participate in the discussion before it began. Key Informant Interview (KII) (4-6 people) on dairy production status, reproductive performance, and reproductive disorder in the study area were conducted with A.I. technician, dairy expert, development agents, animal nutrition, and health.

Analyze the Data

The collected data were analyzed using Statistical Package for Social Sciences (SPSS) version 20 software. Descriptive statistics such as overall means, standard error (SE), graphs, tables, frequency, and percentage were used to summarize the results. A z-test with a P-value of 5% was used to determine the significance of differences between different means.

Results and Discussion

Production and reproductive performance of dairy cattle

Lactation Performance of Dairy Cows

Daily Milk Yield

Table 1 shows the overall mean daily milk production of local and cross breed dairy cows in Ilu and Waliso districts. Local and cross breed dairy cows produced an average of 1.89 ± 0.05 and 7.41 ± 0.31 liters of milk per cow per day, respectively. In Ilu and Waliso, the average daily milk yield for indigenous cows was 1.5 ± 0.08 and 2.04 ± 0.56 liters per day, while for crossbreed cows, it was 6.54 ± 0.58 and 8.03 ± 0.32 liters per day, respectively. These differences were statistically significant (P 0.05) between the two

districts. The results from the current study were lower than the general mean of 2.2 liters per cow per day for locally bred cows but higher than the 6.5 liters per cow per day for crossbred cows reported by Ulfina *et al*., (2013) in the peri-urban dairy production system of western Oromia.

The daily milk production of local and cross breed cows in Ilu averaged 1.5 and 7.21 liters, respectively, which is comparable to the value for Horro cows in western Oromia reported by Damissu *et al.,* (2014) ; Lemma (2004). On the other hand, observed lower average milk yields for local Arsi cows, which were 1.0 liters per day, and crossbred cows, which were 5.8 liters per day. The average milk yield for local-bred cows in this study was also greater than the figure (1.76 liter) reported by Duguma *et al*., (2012) in the Dandi district. On the other hand, Adebabay (2009) stated that crossbred cows in Bure District produced more milk on average every day (8 liters/cow/day). Poor management practices in terms of health care, feeding, and watering could be the cause of these problems

Average Lactation Milk yield

Table1 shows the typical lactation milk yield of local and cross breed dairy cows in Ilu and Waliso. The results revealed that the difference in lactation milk yield between local cows (319.52 ± 5.10 vs. 493.27 ± 16.88) and crossbred cows (1577.45 ± 184.23 vs. 2298.189 ± 4.89 liter per lactation) was statistically significant (p0.05). In the present study, the average lactation milk yield for cross-breed cows was lower than the number of litters (1978.45 ± 97.98) reported by Belay *et al*., (2012) in Jimma town. The results of the current study were comparable to those by Belete *et al*., (2010), who found that crossbred cows produce milk that ranges from 1200 to 2500 liters throughout a lactation period of 279 days, while indigenous cattle breeds produce milk that ranges from 400 to 680 liters on average. Genetic and other non-

genetic factors play a major role in the variation in lactation milk output. The genetic group, calving season, and parity all significantly affect lactation milk production (Kumar *et al*., 2014).

Lactation Length

The average lactation period in months for local and cross breed dairy cows in Ilu and Waliso Districts are shown in Table 1. The average lactation length for local and cross breed cows was obtained to be 7.58 ±0.05 and 8.90± 0.29 months, respectively. The average lactation lengths were substantially different (P0.05) between the two districts for local cows (7.10±0.31 vs. 8.06±0.16) and cross-bred cows (8.04±0.49 vs. 9.54±0.32 months), respectively. This indicated that Waliso has superior management and more suitable grazing land than Ilu. The average lactation period for cows in Ilu and Waliso was longer than seven months on average for the country (CSA, 2021). However, the duration of lactation for locals in Waliso was comparable

The overall mean lactation length found in the current study was less than the figure (273.9 and 333.9 days) reported by Ayalew and Asefa (2013) for native and cross-breed cows in the North Showa zone, respectively. The lactation length for cross-breed dairy cows in Waliso was reported in the current study, and it was almost the same as the values (9.9, 9.7, and 9.8 months) reported by Tekle *et al*., (2016) in the Addis Ababa region in Bishoftu, Akaki Kality, and Kolfe Keranio. However, the current outcome for indigenous cows in Waliso exceeded the outcome (8.23 months) reported by Niraje *et al.,* (2014) in the Tigray region. Poor management and under-supplementation of cows, especially during the lactation phase, as well as inherent variances in breed type, feed quality, and management practices may be to blame for the discrepancies between locations.

Table 1. Lactation performance of dairy cows in the study area

Breed	Lactation	Ilu Mean±SE	Waliso Mean±SE	Overall mean	P-value
Local breed	DMY (liter)	1.5±0.08	2.04±0.56	1.89±0.05	P<0.05
	LL(Months)	7.10±0.31	8.06±0.16	7.58±0.05	P<0.05
	ALMY(Liter)	319.5±25.10	493.27±16.88	429.78±17.10	P<0.05
Cross breed	DMY(Liter)	6.54±0.58	8.03±0.32	7.41±0.31	P<0.05
	LL(Months)	8.04±0.49	9.54±0.32	8.90±0.29	P<0.05
	ALMY(Liters)	1577.45±184.23	2298.18±94.89	1978.45±97.98	P<0.05

DMY (L) =Daily milk yield, LL (M) =Lactation length, AMYL (L) =Average milk yield, mean ±SE= Mean and standard Error, P-value (P<0.05) =significant, P-value (P>0.05) = not significant**,**

Reproductive performance of dairy cattle

Age at first service

The average age at first service for local and cross breed heifers in Ilu and Waliso districts was shown in Table 2. The age at first services (AFS) is the age at which heifers attain body condition and sexual maturity for accepting services for the first time and it is also considered to be the age of puberty. For local and cross breed heifers, the average ages at first services were 44.88±0.57 and 24.43±0.29 months, respectively. A local heifer in the Ilu district was found to be more sexually mature and to have first services at a considerably younger age (39.42±1.04 months) than those in the Waliso district (46.89±0.53 months). However, there was no significant (P0.05) difference in AFS for crossbred cows between the two areas (24.04±0.29 vs. 24.71±0.45 months).

In keeping with the value (24.30±8.01 months) reported by Duguma *et al.* (2012) for cross breed dairy cows in Jima Town, the average AFS recorded for cross breed in Ilu and Waliso. The current findings, however, were longer than the AFS (22, 23.2, and 23.2 months) reported by Tekle *et al.* (2016) in the area surrounding Addis Ababa in Bishoftu, Akaki Kality, and Kolfe Keranio and shorter than the report of Zewdie (2010) in the highlands and central rift valley of Ethiopia. For cross-breds, the age at first service was somewhat similar in Ilu and Waliso. However, it was greater for locals in Waliso than Ilu. This difference might be due to different management practices for housing, health care, and feeding.

Age at First Calving

Table 2 shows the typical age at first calving for local and cross breed heifers in Ilu and Waliso. For local and crossbred heifers, the average age at first calving was 53.94±0.56 and 33.43±0.29 months, respectively. In Ilu, the average AFC for local cows was 48.42±1.04 and in Waliso, it was 33.04±0.29 and 33.43±0.29 months, respectively. These differences were statistically significant (p0.05). However, there were no appreciable changes in AFC between the two areas for cross-bred cows that were 33.71±0.45 and 33.04±0.29 months old. However, compared to Hunduma (2012) in the Oromia regional state of Arsi Zone, in the town of Assela, and Kumar and Tkui (2014) in Mekelle, the mean age at first calving in the current study was lower. Furthermore, the findings of the current study on the age of first calving are roughly in agreement with those of Tekle *et al.* (2016) who reported findings of 32.7, 33, and 33.3 months in the Addis Ababa region in Bishoftu, Akaki Kality, and Kolfe Keranio, respectively. The current finding for local heifers in Ilu was lower than the figure of 54.6 months for local Fogera heifers reported by Gidey (2001), but greater in the Waliso district. The mean age at first calving for the local

breed reported in the current study was higher than the figure of 50.59 months for the local heifer reported by Duguma *et al.* (2012) in the Dandi district. This could be caused by inadequate dietary intake, medical attention, heat dictation, timely insemination, and a lack of own bull.

Calving Interval

Table 2 shows the mean calving interval for native and hybrid cows in the districts of Ilu and Waliso. The time between two successive parturitions is known as the calving interval, and it should ideally be between 12 and 13 months. One of the key reproductive performance factors that affect dairy production in the regions is the calving interval (CI). Internal calving dates ranged between 14.35 and 0.41 months for native breeds and 13.69 and 0.49 months for cross breeds, on average. In Ilu and Waliso, respectively, the average age at first calving (AFC) for indigenous cows was 14.53±0.73 and 14.28±0.48 months; while for cross-breed cows it was 13.90±0.29 and 13.54±0.73 months. However, there was no statistically significant difference (P>0.05) between the two districts.

In comparison to Ayalew and Asefa (2013), who found 24.94 days for indigenous breed in North Shoa Zone of Oromia regional state, the local breed outcome from the research areas was less favorable. The average calving interval for local breeds in the research locations, however, is comparable to the figure of 14.63 months for the Boran breed reported by Tadesse, and Dessie (2003). The current results for the native and mixed breed in the districts of Ilu and Waliso were comparable to the figure of 14.36 published by Niraje *et al.* (2014) in the Tigray region. However, the value 14.36, 14.63, and 14.72 months reported by Tekle *et al.* (2016) in the vicinity of Addis Ababa in Bishoftu, Akaki Kality, and Kolfe was lower in the current

The calving interval for cross breed animals in the present study, however, was

slightly longer than the results of Genzebu *et al.* (2016) and Hunduma (12) at Bishoftu and in Assela town, which were reported to be 13.02 and 12.4 months, respectively. The current discovery for mixed-breed dairy cows, however, was consistent with the 13.6-month calving interval figure published in Zuway by Yifat *et al.* (2009). This discrepancy may be caused by subpar management techniques in the areas of feeding, healthcare, inadequate heat detection, and timely insemination**.**

Day Open

Table 2 shows the typical days open for local and cross bred cows in Ilu and Waliso Districts. Days open, also referred to as the calving-to-conception interval, refers to the gap in cows between calving and conception. The average number of days that local and cross breeds were available was 161±0.41 and 140±0.49, respectively. The average days open for local and cross-bred animals did not differ between the two districts considerably (P>0.05). The number of days that are now available for local cows is less than the 34±0.3 days that were recorded for Boran cows at the Tatesa cattle breeding station (Yifat *et al.,* 2012). According to the study's findings, the cross-bred cows' average days open in the study locations varied greatly from the mean.

The current findings and the literature on DO that is now available in the nation both indicated that very poor performance as the norm for DO is typically around 85 days. Both locally bred and crossbred cows' future reproductive success and lifetime output are impacted by this prolonged DOS. There are several different factors contributing to this poor reproductive performance. Among additional issues that need to be addressed in the future is the availability of feed in sufficient quantity and quality, inadequate heat detection, silent heat, and bad AI services.

Number of Services Preconception (NSPC)

The average NSPC for local and cross breed cows in Ilu and Waliso Districts are shown in Table 2. The amount of natural or artificial services needed for a successful conception is known as the number of services per conception (NSPC). The difference between the two areas in the average number of services per conception for local and cross-bred animals was not statistically significant (P>0.05).

From the result of the study the average NSPC was in line with the result 1.52,1.67 and 1.56 reported by Hunduma (2013); Yifat *et al.* (2009); Duguma *et al.* (2012) in Oromia regional state of Arsi Zone, in Asella town, in the mid Rift valley of Ethiopia and Oromia regional state, in Jimma town, respectively. The overall mean NSPC both for local and cross breed dairy cows in the present study was in line with the result (1.7) and (1.8) reported by Lobago *et al.* (2006) and Tadesse *et al.* (2010) in the highlands of Ethiopia, respectively. However, for cross breed in Ilu and Waliso were lower than the results (1.9, 1.93 and 1.96) reported by Tekle *et al.* (2016) around Addis Ababa in Bishoftu, Akaki quality and kolfe keranio, respectively.

The NSPC was significantly affected by the herd, season, placenta expulsion time, lactation length and milk yield (Abdel and Alemam, 2008). The higher number of services is an indication of postpartum reproductive problems, poor heat detection skills, the inefficiency of AI and/or poor body condition of the cows at mating, Shortage of AITs', input shortage (semen and liquid nitrogen), inexperienced AITs' and low semen quality might be the main problem which results failure to conceive with the first insemination in the study areas**.**

Table 2. Reproductive performance of dairy cattle in the study area

Breed	z	Reproductive	Ilu Mean±SE	Waliso Mean±SE	Overall mean	P-value
Local heifers		AFS (months)	39.42±1.04	46.89±0.53	44.88±0.57	P<0.05
		AFC(Months)	48.42±1.04	55.97±0.51	53.94±0.56	P<0.05
		CI (months)	14.53±0.73	14.28±0.48	14.35±0.41	P>0.05
		DO (days)	168±+0.78	158±0.48	161±0.41	P>0.05
		NSPC (times)	1.69+0.15	1.69±0.07	1.69±0.06	P>0.05
Cross heifers		AFS (months)	24.04±0.29	24.7±0.45	24.43±0.29	P>0.05
		AFC(Months)	33.04±0.29	33.70±0.45	33.43±0.29	P>0.05
		CI (months)	13.90±0.60	13.54±0.73	13.69±0.49	P>0.05
		DO (days)	145±0.60	136±0.73	140±0.49	P>0.05
		NSPC (times)	1.54±0.14	1.85±0.14	1.70±0.10	P>0.05

AFS (M) =Age at first service in months, AFC (M) = Age at first calving in months,
CI (M) =calving interval in months, DO=Days Open-Value (P<0.05) =Significant
P-Value (P>0.05) =not significant

Reproductive disorder (RD) of dairy cows in the study area

Figure 1 depicts the main reproductive disorder that respondents reported. The respondents reported that reproductive disorders were abortion (5.3 % and 19 %), stillbirth (5.3 % and 10.7 %), RFM (7.9 % and 5.3 %), and dystocia (7.9 % and 4.8 %). In addition, mastitis had a significant prevalence that was similarly associated with those reproductive problems (10.5 %) in Ilu and 13.1 % in Waliso).

Still Birth

In the current study, the overall percent of stillbirth was 8%. According to Meyer *et al*. (2001) and Hansen (2004) the overall prevalence of stillbirth in the current finding was within the range of stillbirth (10-13 %). The current findings of stillbirth, however, were higher than the figures (2.8 %, 3.01%, and 2.0 %) reported by Haile *et al*. (2010), Dawit and Ahmed (2013), and Mekonnin *et al*. (2015) in the Addis Ababa milk shed, Kombolcha, northeast Ethiopia, and the capital city of Tigray, respectively. This showed that stillbirth rates (10-13 percent) were inside the study areas, which had a minimally detrimental

influence on the health of the cows and decreased their ability to reproduce.

Dystocia

Dystocia is characterized as an unusual, challenging, or delayed labor. It is anticipated to affect 3-5 % of adult cattle and 10-15% of first-calf heifers 6.35% of the calves in the current study experienced dystocia, or calving difficulties, which was greater than the expected incidence for older cows. The current conclusion was comparable to the value of dystocia (5.79 %) in small-scale dairy cows in and around Debre Zeit reported by Mamo (2004). Additionally, it was discovered that the Ilu district had a higher rate of dystocia than the Waliso district. The current value in the Ilu district was identical to the outcome (7.75%) that Dawit and Ahmed reported (2013). In contrast, the prevalence of dystocia reported by Angesom *et al.* (2013) and Gashaw *et al.* (2011) was higher than the value of the current finding (2.9% and 3.8 %) (2004). this variance in the occurrence of dystocia may be caused by the influence of factors like age and sire breed, in addition to other factors.

Abortion

One of the main reasons for financial losses in the cattle sector is abortion. 12.15 % of all abortions were recorded in the current study. The overall percentage of the current finding was consistent with the value of abortion reported by Benti and Zewdie (2014) in the Borena zone (12.2 %). The prevalence rate of the current discovery, however, was higher than the figures (2.23%, 3.19 %, and 5.33 %) reported by Gizaw *et al.* (2007) and Ebrahim (2003), respectively, for Adama and Kombolcha. In a similar vein, the results reported by Angesom *et al.* (2013) in Central Ethiopia (6.7%) were higher than the results of the present study. The current finding , was lower than the figures of 13.9 and 14.6 %.Abortion rates may vary because of alterations in metabolism or hormones, nutritional shortages, stress, toxins, or infectious agents (Ortega -Mora, 2007 *et al.,*; Givens, 2006). Compared to most preceding studies from various regions of the country, the prevalence rate of abortion reported in the Waliso area is generally greater. This necessitates systematic intervention to stop this reproductive disease, which has caused a number of reproductive performance features to fail in the aftermath.

Retention Fetal Membrane (RFM)

Figure 1 displays the percentage of RFM as indicated by the sample household farmers. Following parturition, retention of the fetal membrane (RFM) in cattle is one of the most common pathogenic disorders. Placenta retention was defined as a cow's inability to spontaneously remove the placenta during the first 12 hours after giving birth. In the current study, the respondent's overall proportion of RFM was 6.6 percent. In comparison to the results (16.7%, 14.28%, and 19.2%) reported by Mamo (2004) and Gashaw *et al.* (2011), respectively, the present finding's overall percentage was lower.

In contrast to the values of 11.5%, 14.7%, and 19.2% reported by Mekonnin *et al.* (2015), Haile *et al.* (2010), and Gashaw *et al.* (2011) in and around Mekelle, in Addis Ababa milk shed, and in Jimma town, respectively, the prevalence of retained fetal membranes in the Ilu district was lower at 7.9%. The nutritional quality and management of dairy cows are predisposing factors that may account for variations in RFM occurrence. It causes significant complications and has a negative impact on the animal's future fertility and productivity, leading to significant financial losses.

Mastitis

Whatever the cause, mammary gland irritation is referred to as mastitis. It is characterized by pathological alterations in the gland and physical, chemical, and typically bacterial changes in the milk (Radostits *et al.,* 2006). Mastitis affects cows that are experiencing reproductive abnormalities, even though it is not a true reproductive disorder in and of itself. Mastitis was present in an overall percentage of 11.80 percent. The results of 12.2 percent published by Benti and Zewdie (2014) in the Borena Regional zone were quite similar to the current finding. This could be a sign of bad sanitary disparity between the two districts.
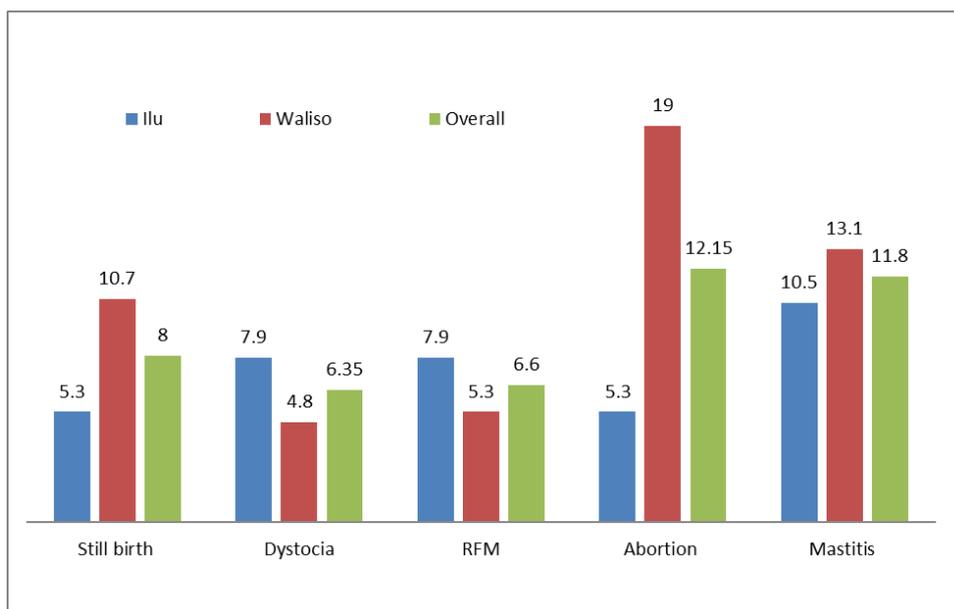
Figure 1. The common reproductive disorder in the study area

Conclusion

This research was conducted in Ilu and Waliso districts with the objective to assess lactation, reproductive performance, and disorder of dairy cows. Local and cross dairy cows have poor average daily milk yield, lactation length, and average milk yield in the area. The reproductive performance of dairy cows was low in terms of their ages at first services, ages at first calving, calving interval, and day open. In conclusion, results revealed that both local and cross dairy cows had poor lactation and reproductive performance. Therefore, the low lactation, reproductive performance and disorder of dairy cows indicated that the urgent need for coordinated interventions from all stakeholders and deep investigation should be implemented in the future. Based on the above results and conclusion the following recommendations were for warded:

1- Improvements should be made to the delivery of extension services, including veterinary services A.I. and feed quality.

2- Dairy cow management should be implemented to lessen reproductive issues that may directly or indirectly affect lactation and reproductive performance in dairy cattle.

3- All relevant organizations should work together urgently to improve lactation and reproductive performance, which would improve the livelihood of dairy producers.

Conflict of Interest

There is no conflict of interest between authors.

Acknowledgements

References

Abdel, I.M.K. and Alemam T.A. (2008). Reproductive and productive performance of Holstein-Friesian cattle under tropical conditions with special reference to Sudan a review. *Agric. Rev., 29*(1), 68 – 73.

Adebabay, K. (2009). Characterization of milk production systems, marketing and on-farm evaluation of the effect of feed supplementation on milk yield and milk composition of cows at Bure District, Ethiopia. *CGS*, *11*, 112.

Mekonnin, A. B., Harlow, C. R., Gidey, G., Tadesse, D., Desta, G., Gugssa, T., and Riley, S. C. (2015). Assessment of reproductive performance and problems in crossbred (Holstein Friesian X Zebu) dairy cattle in and around Mekelle, Tigray, Ethiopia. *Ethiopia. Anim. Vet. Sci*, *3*(3), 94-101.

Benti, A. D., and Zewdie, W. (2014). Major reproductive health problems of indigenous Borena cows in Ethiopia. *Journal of Advanced Veterinary and animal research*, *1*(4), 182-188.

Behnke, R. and Metaferia, F. (2011).The Contribution of Livestock to the Ethiopian Economy-Part II, IGAD Livestock Policy Initiative (LPI) Working Paper No. 02-11,

Duguma, B., Kechero, Y., and Janssens, G. P. J. (2012). Productive and reproductive performance of Zebu X Holstein-Friesian crossbred dairy cows in Jimma town, Oromia, Ethiopia. *Global Veterinaria*, *8*(1), 67-72.

Belete, A., Azage T., Fekadu B. and Birhanu G. (2010). Cattle and Meat Production and marketing systems and opportunities for market orientation in Fogera Woreda, Amhara region, Ethiopia. IPMS of Ethiopian Farmers Project Working Paper 19. ILRI, Nairobi, Kenya.

Brasesco, F., Asgedom, D., and Sommacal, V. (2019). 'Strategic Analysis and Intervention Plan for Cow Milk and Dairy Products in the Agro-Commodities Procurement Zone of the Pilot Integrated Agro-Industrial Park in Central-Eastern Oromia, Ethiopia'. Food and Agriculture Organization of the United Nations 1-10.

CSA, (Central Statistical Authority). (2021). Agricultural Sample Survey. Addis Ababa, Ethiopia.

CSA, (Central Statistical Agency). (2021). Federal Democratic Republic Of Ethiopia. Vol. II.

Demissu, H., Fekadu, B., and Gemeda, D. (2014). Dairy productive potential, challenges and production opportunities of horro and their F1 Jersey crossbred cows. A Case of Guduru Livestock production and Research Center and Its Surroundings, West Oromia, Ethiopia. *Science, Technology and Arts Research Journal*, *3*(4), 79-84.

Dawit, T., and Ahmed, S. (2013). Reproductive health problems of cows under different management systems in Kombolcha, Northeast Ethiopia. *Advances in Biological Research*, *7*(3), 104-108.

Genzebu, D., Tamir, B., and Berhane, G. (2016). Study of productive and reproductive performance of cross breed dairy cattle under smallholders' management system in Bishoftu and Akaki towns. *Int. J. Agric. Sci*, *6*(2), 913-917.

FAO, (Food and Agriculture Organization). (2007). The appropriateness, significance and application of biotechnology options in the animal agriculture of the developing countries.

Gashaw, A., Worku, F., and Mulugeta, S. (2011). Assessment of Small Holder Dairy Production System and Their Reproductive Health Problems in Jimma Town, Southwestern Ethiopia. *International Journal of*

Applied Research in Veterinary Medicine, *9*(1), 80-86.

Giday, Y. (2001). Assessment of calf crop productivity and total herd life of Fogera cows at Andassa ranch in North-western Ethiopia. *MEd Thesis, Alemaya University, Dire-Dawa, Ethiopia*.

Givens, M. D. (2006). A clinical, evidence-based approach to infectious causes of infertility in beef cattle. *Theriogenology*, *66*(3), 648-654.

Gizaw, Y., Bekana, M., and Abayneh, T. (2007). Major reproductive health problems in smallholder dairy production in and around Nazareth town, Central Ethiopia. *Priory Medical Journal Online*, *2*. https://priory.com/vet/dairyproduction.htm.

Angesom, H., Adem, A., & Fikru, R. (2013). Major prepartum and postpartum reproductive problems of dairy cattle in Central Ethiopia. *Journal of Veterinary Medicine and Animal Health*, *5*(4), 118-123.

Haile A, Kassa T, Mihret M, Asfaw Y. A. (2010). Major reproductive disorders in crossbred dairy cows under smallholding in Addis Ababa milkshed, Ethiopia. *World Journal of Agricultural Sciences*, *6*(4), 412-418.

Hansen, M. (2004). Quantitative genetic analysis of mortality in Danish Holstein calves. In PhD thesis. The Royal Veterinary and Agricultural University Copenhagen, Denmark.

Hunduma, D. (2012). Reproductive performance of crossbred dairy cows under smallholder condition in Ethiopia. *International Journal of Livestock Production*, *3*(3), 25-28.

Hunduma, D. (2013). Major reproductive disorders of dairy cows in and around

Asella town, Central Ethiopia. *Journal of Veterinary Medicine and Animal Health*, *5*(4), 113-117.

Jan, V., Abebe, T., Mengistu, N., and Mekdes, A. (2010). A capacity needs assessment of dairy chains in the Addis Abeba Milk shed. *Wageningen UR Centre for Development Innovation, Wageningen, the Netherlands in collaboration with SNV Ethiopia, Addis Abeba, Ethiopia*.

Kumar, N., Eshetie, A., Gebrekidan, B., & Gurmu, E. B. (2014). Reproductive performance of indigenous and HF crossbred dairy cows in Gondar, Ethiopia. *IOSR-JAVS. 7* (1), 56-61.

Lemma, F. (2004). Assessment of butter quality and butter making efficiency of new churns compared to smallholders' butter making techniques in East Shoa Zone of Oromia. *Alemaya University, Alemaya*.

Lobago, F., Bekana, M., Gustafsson, H., & Kindahl, H. (2006). Reproductive performances of dairy cows in smallholder production system in Selalle, Central Ethiopia. *Tropical animal health and production*, *38*(4), 333-342.

Mamo, T. (2004). Study on major postpartum reproductive problems of smallholder dairy cows in and around Debrezeit. DVM Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debrezeit, Ethiopia.

Meyer, C. L., Berger, P. J., Koehler, K. J., Thompson, J. R., & Sattler, C. G. (2001). Phenotypic trends in incidence of stillbirth for Holsteins in the United States. *Journal of Dairy Science*, *84*(2), 515-523.

Tadesse, M., and Dessie, T. (2003). Milk production performance of Zebu, Holstein Friesian and their crosses in

Ethiopia. *Livestock research for rural development*, *15*(3), 1-9.

Million, T., Theingthan, J., Pinyopummin, A., Prasanpanich, S., & Azage, T. (2011). Oestrus Performance of Boran and Boranx Holstein Fresian Crossbred Cattle Synchronized with a protocol based on Estradiol benzoate or Gonadotrophin-Releasing Hormone. *Kasetsart Journal (Natural Science)*, *45*, 221-232.

Molalegne, B. and Shiv, P. (2011). Study on Major Reproductive Health Problems in Indigenous and Cross Breed Cows in and Around Bedelle, South West Ethiopia. *Journal of Animal Vet. Adv, 10*(6), 723-727.

Mukasa-Mugrewa E.1989.A review of reproductive performance of Bos-indicus cattle. ILCA Monograph, Addis Ababa, Ethiopia. 24, 63-72.

Ayalew, M., and Asefa, B. (2013). Reproductive and lactation performances of dairy cows in Chacha Town and nearby selected kebeles, North Shoa Zone, Amhara Region, Ethiopia. *World Journal of Agricultural Sciences*, *1*(1), 8-17.

Nibret, M. (2012). Study on reproductive performance of crossbred dairy cows under small holder conditions in and around Gondar, North Western Ethiopia. *Journal of Reproduction and Infertility*, *3*(3), 38-41.

Niraje, Alemayehu E., Berihu G.and Endale B. (2014). Reproductive performance of Indigenous and Holstein Frisian cross bred dairy cows in Gondar, Ethiopia.56-61.

Ortega-Mora, L. M., Gottstein, B., Conraths, F. J., and Buxton, D. (2007). Ruminants: Guidelines for diagnosis and control in farm protozoal abortion. *CAB International, UK*, 42-122.

Ebrahim, O. (2003). Study on major reproductive health problems of small holder dairy farms in and around Kombolcha. *Unpublished DVM Thesis, Addis Ababa University.*

Radostits, O. M., Gay, C., Hinchcliff, K. W., and Constable, P. D. (Eds.). (2006). *Veterinary Medicine E-Book: A textbook of the diseases of cattle, horses, sheep, pigs and goats*. Elsevier Health Sciences.

Tadesse, M., Thiengtham, J., Pinyopummin, A., and Prasanpanich, S. (2010). Productive and reproductive performance of Holstein Friesian dairy cows in Ethiopia. *Livest. Res. Rur. Dev. 22* (2), 21.

Ulfina, G., Jiregna, Alganesh, T., Shiv, p. and Late, M. (2013). Dairy production potential and challenges in western Oromia milk value chain, Oromia, Ethiopia. *Journal of Agriculture and Sustainability*, *2*(1), 1-21.

Yamane, Taro. (1967). Statistics: An Introductory Analysis, 2nd Ed., and New York: Harper and Row.

Yifat, D., Bahilibi, W., and Desie, S. (2012). Reproductive performance of Boran cows at Tatesa cattle breeding center. *Advances in Biological Research*, *6*(3), 101-105.

Yifat, D., Kelay B., Bekana, M., Lobago, F., Gustafsson, H., Kindahl, H. (2009). Study on reproductive performance of crossbred dairy cattle under smallholder conditions in and around Zeway, Ethiopia. *Livestock Research for Rural Development, 21*(6).

Zegeye, Y. (2003). Challenges and opportunities of livestock marketing in Ethiopia. In: Proceedings of the 10-annual conference of Ethiopian Society of Animal Production (ESAP), in Addis Ababa, *Ethiopia, 7*, 47-54.

Tekle, Z., Guadu, T., Demissie, K., Mitku, F., and Demessie, Y. (2016). Assessment of Reproductive Performance of Crossbred Dairy Cattle among Dairy Farms in and Around Addis Ababa, Central Ethiopia. *Global Veterinaria*, *17*(4), 358-364.

Zewdie, W. (2010). Livestock production systems in relation with feed availability in the highlands and central rift valley of Ethiopia. MSc. Thesis.