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Assessment Of Reproductive Health Disorders In Dairy Cattle And Its Associated Risk Factors In Melka Belo Woreda Of East Hararge Zone, Oromia, Ethiopia

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Abstract

Reproductive disorder is one of the most important factors impacting the profitability of the cow-calf operation. A cross-sectional study was undertaken to determine reproductive health disorders in dairy cattle and its associated risk factors in Melka Belo Woreda East Haraghe Zone from March, 2022 to August, 2022. Of a total of 50 respondents 6 (12.0%) were AI professionals, 14 (28.0%) were animal health professionals and 1 (5.88%) were doctors of veterinary medicine all of them worked in veterinary clinics were interviewed in this study area. From the total of cows examined, 127 (31.99%) had at least one of the reproductive problems identified by both retrospective (n=384) and regular follow-up (n=13) of individual cows. The major reproductive problems identified in the present study were dystocia (9.5%), retained fetal membrane (7.233%), repeat breeder (4.99%), prolapse of the uterine and vagina (4.22%), anestrous (3.5%) and abortion (2.24%) respectively. The prevalence of assessed reproductive problems revealed significant differences ($p<0.05$) concerning age and body condition of dairy cattle while breeds and parity were not statistically significant ($p>0.05$) on the occurrence of the reproductive problems in dairy cattle. Generally, the current finding revealed that reproductive health problems commonly exist in the study area through their percentage and types with variety from time to time. This study showed that reproductive disorders were highly found to affect the reproductive performance of dairy cows. Hence, regular reproductive health management and proper husbandry practices could be possible solutions to alleviate the problems encountered in different production systems. Also, further detailed studies should be carried out on the major reproductive health disorders in the study area.

Keywords: Dairy Cattle, Melka Belo, Reproductive Problems, Risk factors

Introduction

With an estimated 54 million cattle, 25.5 million sheep, and 24.06 million goats, Ethiopia has the greatest population of livestock in Africa and is home to numerous different livestock species. About 99.2% of the cattle population is made up of indigenous breeds, whereas hybrids and exotic breeds with high productivity were only represented by 0.1% and 0.64%, respectively [1]. In emerging nations, where it represents more than a third of the agricultural GDP, livestock production is one of the agricultural subsectors with the greatest rate of growth [2]. To meet the forecasted demand for animal products, livestock output is anticipated to increase significantly. Therefore, to increase productivity and efficiency, livestock production methods must change [3].

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The development of pastures, breed improvement, and animal health have been given top priority in Ethiopia to boost livestock productivity and meet the rising demand for livestock products. To boost the contribution of cattle to economic growth and to satisfy the rising local demand, the nation has given close attention to cow productivity (meat and milk) through breeding and health treatments [4]. One essential element of dairy production is reproductive performance, and reproductive management in dairy cattle aims to have cows become pregnant quickly and profitably following calving. Therefore, a successful dairy farm requires high reproductive efficiency and a calving interval that maximizes milk production within the herd [5].

According to Birmani *et al*. [6], a proxy for dairy herd efficiency is the amount of milk sold per cow per day of life. The pregnancy rate following insemination is a key factor in the dairy industry's economic performance. The high milk yield per cow and good economic return are advantages of the 12-month calving interval. To maximize the profit from dairy production, the high reproductive efficiency of cows is crucial [7].

Dairy production has been hampered by a variety of complex, production system-specific constraints related to genotype, diseases, feed resources, and feeding systems, as well as access to services and inputs, low adoption of better technologies, marketing, and a lack of clear policy support for the industry [8]. Animal production might be hampered by any defect in the reproductive system. Dairy cow reproductive issues are caused by a variety of factors, including control of reproduction and ovarian and uterine health [9].
Abortion, dystocia, pyometra, metritis, prolapse (uterine and vaginal), anestrous, and repeat breeder are a few of the primary reproductive issues that have a direct impact on the reproductive performance of dairy cows. According to Wujira and Nibret [10], they can occur before gestation (anestrous and recurrent breeding), during gestation (abortion, vaginal prolapse, and dystocia), or after (retained fetal membrane and uterine prolapse). Dairy cattle with various reproductive health issues may perform less successfully during reproduction. Slower uterine involution, extended interconceptional and calving intervals, adverse effects on fertility, higher medication costs, a decline in milk output, and early depreciation of potentially viable cows are all results of this issue [9].

According to studies carried out in various regions of Ethiopia, 66.15% of dairy cattle in and around Bale Robe, Oromia Regional State, Ethiopia, were affected by one or more reproductive disorders [11], and a retrospective analysis of clinical data in Eastern Ethiopia revealed that 24.2% of the cows had serious pre-partum and postpartum reproductive problems [9]. The incidence of reproductive health issues in cows was also documented by Beredu and Biruk [12] in the Wondo Genet district in southern Ethiopia and Asella Town in central Ethiopia, respectively.

As a result, numerous research on dairy cow reproductive issues were conducted in Ethiopia's central, southern, southwestern, northern, northeastern, northwestern, and western regions, with varying degrees of success. Even though reproductive issues in dairy cattle can result in significant financial losses for dairy farms, no research has been done in the studied area. Therefore, the objective of the study was:

- To determine reproductive disorders of dairy cattle and its associated risk factors for the

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occurrence of the problems in the study area.

2. REPRODUCTIVE PROBLEMS IN DAIRY CATTLE

Individuals produce their offspring through the intricate process of reproduction to extend life. The sexual cycle of an adult bovine female who is not pregnant and in good health lasts 20 to 21 days, with extremes ranging from 17 to 24 days [13]. This is true for both heifers and cows. A multitude of psychological and management issues that have an additive influence on reproductive effectiveness are the main causes of dairy's diminishing health. To provide the expanding demand for products, the dairy sector depends on the reproductive efficiency of their dairy cows [4].

The management systems (such as methods of husbandry, breeding strategy, estrus detection, semen handling, and transition cow management) that dairy cows are kept under, as well as the animal factors (genetic, age, body condition), nutrition (availability of green fodder year-round), and environmental conditions (such as geographic location, season of calving, and suckling status), all have an impact on the reproductive efficiency of these animals [14; 15; 16]. The expression of oestrus, the creation, transportation, and fertilization of ova, as well as the transport, implantation, and survival of the conceptus, can all be impacted by reproductive issues in dairy cows [17]. Oestrus and ovulation can take place routinely since the cow's ovaries are healthy and functional. Fertilization, conception, and delivery may or may not be possible depending on where the obstruction is located because just one uterine horn may be affected [18].

Huge Animal Theriogenology author Robert Youngquist claims that several uterine illnesses are associated with twins, over-conditioned or under-conditioned body types, huge herd sizes, excessive urea in dry cow diets, or retained fetal membranes. According to Christina and San [19], “traumatic obstetric procedures and unhygienic calving conditions predispose cows to uterine infections.” Due to weakened immunity after giving birth, nearly half of dairy cows in a herd may be affected by multifactorial uterine infections. It's crucial to identify and treat uterine infections in dairy animals because they can cause subfertility, infertility, higher veterinary bills, reduced production, and other reproductive features that can result in significant financial losses for producers [20].

2.1. Types of Reproductive Problems in Dairy Cattle

2.1.1. Abortion.

The premature evacuation of a fetus between 42 days (the expected period of attachment) and roughly 260 days of gestation (the age at which a fetus can survive outside of the uterus) is referred to as an abortion. The most prevalent issue with dairy cows is abortion, which reduces the cow's capacity to deliver a calf each year and can significantly impact the dairy farm's profitability [21]. There is a loss of potential replacement heifers after late-term abortions. The early culling of productive cows is frequently the outcome of these late-term abortions. Additionally, prolonged calving intervals lower output. A loss of 2% to 5% of the herd's potential calf production may result from extending the calving period from 12 to 13 months. In dairy herds that produce milk on average, calving intervals longer than 14 months will result in losses of more than 10% [22].

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Abortion may have infectious or non-infectious causes. Abortion can also be brought on by acidosis, hypoxia, and heat stress. Rarely, severe trauma can cause abortion [23].

Table 1: Infectious causes of abortion in dairy cattle.

Types of Disease	Period of abortion	Clinical signs or lesions	Diagnosis	Control
Bovine Viral Diarrhea (BVD)	42 and 125 days of gestation	Diarrhea (BVD) 42 and 125 days of gestation Fetal death and abortion or resorption, and persistent infection; fetal mummification or deformity	Diagnosis is difficult because BVD does not cause specific fetal lesions. Serological methods could be used.	Vaccination
Infectious Bovine Rhinotracheitis (IBR, Bovine Herpesvirus 1)	≥4 months	Placentitis, infected fetus dies within 24 hr; placentitis with blanched, necrotic cotyledons and edematous, fetus autolysed.	Fluorescent antibody on kidney, histopathology of liver and adrenal, and serology.	vaccination
Leptospirosis	Last trimester, 2- 6 weeks after an outbreak	Placentitis with avascular, light tan cotyledons and edematous, yellowish inter cotyledonary areas fetus autolyzed.	Darkfield or phase-contrast microscopy and fluorescent antibody, Microbiological culture of the dam's urine.	Identify the source of infection and control.
Brucellosis	Second half of gestation (around 7th month)	Cotyledons may be normal to necrotic, and red or yellow: The inter-cotyledonary area is focally thickened with a wet, leathery fetus that may be autolyzed with broncho-pneumonia.	Maternal serology	Artificial insemination and maternity hygiene.

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Mycotic Abortion	≥ 4 months	Cotyledons are enlarged and necrotic with turned-in margins. The intercotyledonary area is thickened and leathery. Adventitious placentation fetus seldom is autolyzed	Hyphae are associated with fetal dermatitis (especially eyelids), bronchopneumonia, abomasal contents, and placental lesions.	Moldy feed should be avoided
Campylo-bacteriosis	5 and 8 months (rare) .	Mild fibrinous pleuritis and peritonitis, bronchopneumonia; placentitis with hemorrhagic cotyledons and edematous inter cotyledonary area, infertility	Darkfield microscopy of abomasal contents or culture of the placenta or abomasal contents; histopathology is also helpful.	Artificial insemination and vaccination.
Listeriosis	At any stage of gestation	Sporadic abortion. The fetal liver is shrunken and gray and contains pinpoint microabscesses. Necrosis of the cotyledons and inter cotyledonary area	Culture of Listeria from fetus or placenta	
Chlamydiosis	Sporadic abortion ≥ 4 months	Placentitis, fetal pneumonia, and hepatitis	Stained smears of cotyledon tissues, culture in embryonated chicken eggs	Ovine chlamydial vaccine.

Source: [23]

2.1.2. Dystocia

The majority of dairy producers deal with dystocia, also referred to as difficult calving or protracted parturition [24]. Dystocia in dairy cows can have a variety of causes and risk factors, which can come from both maternal and fetal factors. Foeto-pelvic incompatibility, often known as FPI, is the physical incompatibility between the mother's pelvic size and the size of the calf during birth that causes dystocia [25].

All first-calf dairy heifers experience an increase in dystocia (difficult birth) rates to around 35%. Dystocia, which results in a significant loss to dairy cattle herds and cannot be foreseen, can be minimized by greater herd management. Cows in labor should be checked on no less frequently than every three hours, and if the first or second stage of labor is taking too long, assistance with delivery should be given [19].

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2.1.3. Retained fetal membrane

When an animal fails to discharge the fetal membranes within 24 hours of giving birth, it is said to have retained fetal membranes. RFM can also go by the name retained placenta. The time is arbitrary, as the majority of healthy cows expel the fetal membranes within a few hours of giving birth [20]. Some people choose to define retention as lasting for 12 hours. High ambient temperatures, rising cow age, early birth or induction of parturition, placentitis, duct infection, and dietary problems all contribute to an increased incidence of the condition [23].

RFM are significant because they are linked to decreased milk production and an elevated risk of metritis. It is a typical bovine parturition problem. RFM are a significant cause of bovine infertility due to their propensity to uterine infections. Failure of the natural processes of placental dehiscence and evacuation is linked to the occurrence of RFM [20].

2.1.4. Anestrus

Complete lack of any sexual activity for longer than two months without any signs of estrus. Whether or not a dairy cow is cycling, the condition is known as Post-Partum Anestrus (PPA) if estrus has not been shown in her by 60 days after giving birth. Either the cow has not entered estrous (cycling has not occurred) or estrus has not been discovered (cycling has not occurred), [26]. Anestrus have two types: True anestrous cows do not go into estrus because their ovaries are dormant. Sub-estrus: The cow exhibits regular cycle activity, but owing to insufficient observation, weak or nonexistent estrous behavior, or both, estrus is not noticed in the cow. Small, flaccid uteri and small, inactive ovaries without a palpable corpus luteum characterize anestrous cows [27].

Depending on the species, breed, parity, season, degree of nutrition, management practices, and geographic context. Adult cattle have anestrus more frequently than heifers. Anestrus causes financial losses due to an increase in the time between calvings, poor net calf crops, productivity losses, medical costs, and the price of replacing mature animals with first-calving heifers [20].

True anestrus is defined as prolonged Corpus luteum periods resulting from the cessation of cyclic activity, from smooth/quiescent ovaries, or the absence of palpable follicles. False anestrus can be pathogenic (caused by pyometra and persistent metritis) or physiological (occurring during nursing, gestation, and open days) [17].

2.1.5. Repeat Breeding

A cow or a heifer that failed to conceive for three or more consecutive services or an animal exhibiting a regular estrous cycle every 18 to 24 days and normal heat signs but failed to conceive after three or more inseminations are considered repeat breeders [28]. Repeat breeding syndrome is responsible for long service periods and inter-calving intervals thereby causing low milk and calf production resulting in greater economic losses to the dairy industry. Tubal blockages, early or late embryonic mortality, and poor breeding and management practices, including genetic, nutritional, and viral variables, are additional risk factors [20].

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2.1.6. Uterine or Vaginal prolapse

Uterine prolapse is a non-heritable abnormal condition of the uterus that typically manifests as the uterus being expelled via the vulva to the outside of the body, happening right after parturition and, on rare occasions, up to several hours afterward [21]. Uterine prolapse is also described by Gustafsson *et al*. [29] as the uterus protruding from the vulva with the mucosal surface visible. When the fetus is ejected and the fetal cotyledons are split from the mother's caruncles, uterine prolapse occurs. A frequent side effect of the third stage of labor in the cow during parturition is uterine prolapse. In ruminants, uterine prolapse typically manifests as a full inversion of the gravid cornua [21].

Prolepsis of the uterus is most frequently observed in pluriparous dairy cows, while it can also occur in malnourished, frail, and disabled dairy heifers. Caruncles can be seen on the uterus, which is prolapsed via the vulva, making the diagnosis rather simple. Other organs, such as the bladder or intestines, may be affected by the prolapse. The uterine artery can rupture in some circumstances, which can be fatal [30].

The last trimester of pregnancy is also when adult cows experience eversion and prolapse of the vagina, with or without prolapse of the cervix. Predisposing factors include increased intra-abdominal pressure brought on by the enlarged uterus of pregnancy, intra-abdominal fat, or rumen distention, which is accompanied by the relaxation and softening of the pelvic girdle and other soft tissue structures in the pelvic canal, and perineum, which is brought on by higher levels of relaxin and estrogens in the blood during late pregnancy. The reclined animal experiences a rise in intra-abdominal pressure [23].

It happens because of increasing pressure in the abdominal cavity during the final stages of pregnancy, just like uterine prolapse. Vaginal prolapse is more likely to occur in older cows, twin-bearing cows, and cows descended from the *Bos indicus*. Due to the phytoestrogens that clover pastures may create, cows that are only allowed to graze them may also have a higher risk of vaginal prolapse [17].

2.3. Status of Some Reproductive Disorders of Dairy Cows in Ethiopia

To maintain a short breeding and calving season and increase the calf crop in dairy farms, reproductive efficiency is one of the most significant aspects affecting the profitability of the cow-calf business [31]. Due to slower uterine involution during parturition, a decreased reproductive rate, prolonged inter-conception, and calving intervals, a negative impact on fertility, higher medication costs a decrease in milk production, a reduction in the number of calves, and early depreciation of potentially useful cows, the dairy industry suffers a significant economic loss [32].

Studies on 12 cattle with major reproductive issues conducted in various regions of the nation have demonstrated the existence of these issues [33; 34; 35]. In and around Bako in West Ethiopia, 217 dairy cows were studied by Haftu and Gashaw [33] for serious clinical reproductive health concerns. Of the total dairy cows studied, 30.4% had one or more clinical reproductive disorders. 37.1% of dairy cows in ILCA and Almaz dairy farms in Ada'a region, Debre Zeit town in East Shoa, were found to have at least one of the major reproductive health issues [36]. Another study on major reproductive

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abnormalities in cross-breed dairy cows kept in small holdings in Addis Ababa found that the prevalence of reproductive illnesses was 67.8% overall [37]. Based on questionnaire interviews in and around Assela in Central Ethiopia, a study by Dinka [35] revealed that 18.3% of dairy cattle have been impacted by either one or more reproductive diseases.

From 711 cows in three chosen farms in Debre Zeit town, a retrospective study by Hadush *et al*. [38] discovered that 44.3% of the cows had serious prepartum and postpartum reproductive problems. Another study using a questionnaire and an observational survey in Hossana's urban and rural areas found that serious reproductive health issues in dairy cattle were 43.07% common [39]. Research in and around Bedelle revealed the prevalence of 26.5% of reproductive issues in South West Ethiopia [34], as well as 8.7% and 18.3% of retained fetal membranes and abortions, respectively in chosen sites of the Arsi zone [40]. Dawit and Ahmed [41] observed a prevalence of 40.3% in the northeastern Ethiopian town of Kombolcha. According to studies by Gizaw *et al*. [42] and Benti and Zewdie [43], respectively, the unemployment rates in the southern Ethiopian region of Borena zone and the central Ethiopian town of Nazareth were 37.76% and 47.7%. Pyometra was found to be 1.6% prevalent in research by Simenew *et al*. [44] on significant gross reproductive system anomalies in female calves butchered at Sululta Slaughterhouse. Smallholder dairy cows are most frequently affected by reproductive issues [42]. Strategic control strategies, such as health education regarding illness transmission, treatment, and control, must be used to reduce reproductive wastage and its risk factors to address these issues [35].

3. MATERIALS AND METHODS

3.1. Description of Study Area

East Hararghe Zone is situated in Ethiopia's eastern region. From March, 2022 to August, 2022, the study will be carried out in the Melka Belo district and the peasant association near the Jaja Veterinary Clinic in the Oromia Regional State. In the highland, mid-highland, and lowland regions of Ethiopia, Jaja is situated 108 kilometers south of Dire Dawa and 276 kilometers east of the capital city Addis Ababa. The location is 1626.03 meters above sea level and is situated at 9.0778650 latitude and 41.3675450 longitudes. It enjoys a comfortable, pleasant environment. Rainfall in the winter is significantly higher than in the summer. The average annual temperature is 17.71°C, and there is an average annual rainfall of 116.25mm. With only 11mm of precipitation, January is the driest month. The most precipitation occurs in July when there is an average of 693.2mm. With an average temperature of 20.5^{o}C, April is the warmest month of the year. August is the coldest month of the year, with an average temperature of 15.6oc. According to a check of the town's yearly relative humidity on the weather-atlas website, the humidity levels range from 40% to 87%.

According to data compiled by the Melka Belo Woreda Livestock and Fishery Development Office in 2010 using the Ethiopian calendar, there are about 200,747 cattle, 38,322 sheep, 190,837 goats, 928 horses, 28,665 donkeys, 555 Mules, 5,418 camels, 185,652 poultry, and 2,580 different types of bee hives. Peasant associations and farmers in the area of Jaja town cultivate a mixed crop that is then broadly separated into lowland and highland regions, as well as a livestock farming system.

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Additionally, the agro-ecologies in Jaja and its surroundings are diverse yet typical of the nation. Different plant and animal species live in these agro-climatic zones.

3.2. Study population.

Residents of the district and members of peasant groups keep dairy cows in the research region using semi-intensive systems and conventional extensive systems, respectively. The average home has three dairy cows. Different native and hybrid breeds of cattle made up of the assessed animals in the district and peasant groups encompass not only breeds but also dairy cows with various parties, age ranges, and physical problems. According to Kripali *et al*. [45], the body condition score was calculated and divided into three categories: bad, medium, and good.

3.3. Sampling size determination and Sampling method

The sample size required for this study was determined depending on the expected prevalence of assessment reproductive problems and the desired absolute precision by the formula given by Thrusfield [46]. Therefore, using a 95% confidence interval, 5% precision, and 50% expected prevalence, the number of cows needed to demonstrate the prevalence of assessment reproductive problems in the district and peasant associations around the districts serviced on-site veterinary clinic were 384 dairy cows.

$$n= \frac{(1.96)^2 Pexp\ (1-Pexp)}{d^2}$$

Where
N= required sample size
P exp = expected prevalence
D= desired absolute precision
1.96 = z-value for 95% confidence interval

$$n= \frac{(1.96)^2 * 0.5(0.5)}{(0.05)^2.} = 384$$

Simple random sampling was used to sample individual animals that needed service from veterinary clinics in PA around the district based on the composition of the livestock population.

3.4. Study design

From March, 2022 to August 2022, a cross-sectional type of study was conducted in the Melka Belo district and the peasant associations nearby that provided services at the Jaja veterinary clinic based on the population of dairy cattle to evaluate the reproductive issues of dairy cattle in the study region.

3.5. Study methodology

3.5.1. Questionnaire survey

The following reproductive issues, including mastitis, dystocia, retained fetal membrane, uterine and

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vaginal prolapse, abortion, anestrus, and repeat breeding, were reported on various questionnaires distributed to veterinarians in the study area, including those working in animal health, artificial insemination, and veterinary medicine. The study population is made up of homes with at least one dairy cow in the districts and peasant associations nearby that provide similar services at their on-site veterinary clinic.

3.5.2. Secondary data

To identify the main reproductive issues in dairy cattle and evaluate associated risk factors of the dairy cattle in the study area, secondary data from 384 cattle were collected from the recorded casebooks used for treatment, control, and prevention of disease programs on the district and site veterinary clinic, including AI casebook of the clinic in the last four years.

3.5.3. Regular follow up

Thirteen dairy cattle that were accessible were chosen, and they were monitored regularly to determine the prevalence and incidence of reproductive abnormalities.

3.6. Data Analysis.

The data was entered into a Microsoft Excel spreadsheet with the risk factors of the study areas upon column parts by coding the value through careful consideration to minimize the error or problem until the end, then saved as the file in the form of an Excel 93-2003 workbook. The data was then analyzed using SPSS version 20 by opening the data that was saved in a Microsoft Excel workbook and converting it into an SPSS data saver. To determine the prevalence of reproductive issues in dairy cows, descriptive statistics were used. The presence of a link between the independent variables (breeds, age, parity, and body condition) of animals and the overall prevalence of reproductive disorders was evaluated using Pearson's chi-square. The 95% confidence level and 5% level of precision were used to create the confidence interval. If the calculated P-value is less than 0.05, an association between the two variables was deemed to be statistically significant. ($p<0.05$).

4. RESULTS

4.1. Questionnaire Survey

The present study results show that out of 50 respondents 37 (74.0%) were males and the rest 13 (26%) were females. With regards to different educational levels and profession, among 50 respondents 6 (12.0%) were AI professionals, 14 (28.0.0%) were animal health professionals and 1 (2.0%) were doctor of veterinary medicine all of them worked in veterinary clinics in the study area, the rest 29 (58.0%) were farmers. The majority of respondents listed diseases as the factors affecting the use of animals. Regarding the knowledge of reproductive disorders, more than half of 29 (58.0%) were aware.

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Table 2: Demographic characteristics of the respondents and knowledge of reproductive disorders

Parameter		Frequency	Percent
Types of respondents	Animal health profession	14	28.0
	AI technicians	6	12.0
	Animal owners	29	58.0
Sex	Male	37	74.0
	Female	13	26.0
Age	20-30	10	5.0
	30-50	31	62.0
	>50	9	18.0
Education status	Illiterate	28	56.0
	Primary	6	12.0
	Above secondary	16	32.0
Importance of animal	Food	28	56.0
	Income generation	13	26.0
	Privilege	9	18.0
Factors affecting the use of animals	Disease	30	60.0
	Poor genetics	6	12.0
	Management	14	28.0
Knowledge reproductive disorder	Yes	29	58.0
	No	21	42.0
How to manage reproductive disorder	Improve management	10	2.0
	Treating case	22	44.0
	Control affected animal	18	36.0

4.2. Prevalence of retrospective study and regular follow-up

In the retrospective study from a total of 384 reviewed case book data on dairy cattle of four consequent years from March, 2018 to February, 2022, 31.2% (n=121) were found with major reproductive problems in selected areas. In the regular follow-up from June, 2022 to August, 2022 the study used a total of 13 dairy cattle 6 (46.2%) of them were found with reproductive problems. The recent study on reproductive problems in dairy cattle depends on the retrospective study and regular follow-up in the study area is presented in Table 2.

Table 3: The reproductive problems in dairy cattle through retrospective study and regular follow-up approach.

Study Method	No. of cows examined	Cows with reproductive Problems (%).
Retrospective study	384	121 (31.51%)
Regular follow up	13	6 (46.2%)
Total	397	127 (31.99%)

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4.3. Prevalence of Reproductive Problems in Dairy Cattle.

A retrospective study from a total of 384 cattle was assessed and recorded from all casebooks of the veterinary clinic in the district and the site during the last four consequent years from March, 2018 to February, 2022 and regular follow-up pregnant dairy cattle. Results revealed 127 (31.7%) were found to be affected with major reproductive problems. The results of the study shown in the Table below indicated that the most commonly encountered reproductive health problems in dairy cattle include dystocia, retained fetal membrane, repeat breeder, prolapse of the uterine and vagina, anestrous, and abortion with a prevalence of 9.5%, 7.233%, 4.99%, 4.22%, 3.5%, and 2.244% respectively.

Table 4: Prevalence of reproductive problems of dairy cattle in the study area through retrospective and clinical follow-up assessment

Reproductive Problems	Retrospectively result n=384	Follow Up Problems observed n=13	Overall Prevalence (n=397)
Dystocia	35 (9.11%)	3 (23.1%)	38 (9.57%)
RFMs	28 (7.29%)	1 (7.7%)	29 (7.30%)
Repeat breeder	20 (5.2%)	0 (0.00%)	20 (5.04%)
Prolapse	17 (4.43%)	0 (0.00%)	17 (4.28%)
Anestrous	12 (3.13%)	2 (15.4%)	14 (3.53%)
Abortion	9 (2.34%)	0 (0.00%)	9 (2.26%)
Total	121 (31.51%)	6 (46.2%)	127 (31.99%)

Retained fetal Membrane, N= number of animals included.

4.4. Factors Associated with Reproductive Problems of Cattle

The current study revealed that the cross-breed configuration at the study was most frequently affected by reproductive disorders with a rate of 40.37% than a local breed that shows 25.1% prevalence. The parity of the pluriparous cows also identified in the study was most often affected by reproductive problems with a rate of 34.2% than primiparas cows shows 20.8%. As shown in (Table 3) below, statistically no significant difference ($P>0.05$) was found in the prevalence of reproductive health problems concerning breeds and parity.

The influence of body condition and age status on the occurrence of major reproductive health problems was also assessed and the result showed that there is statistically significant ($P<0.05$) variation about different body conditions and between ages. The cows with poor body condition were affected by a rate of 53.42% which was mostly higher rate than the occurrence of the reproductive disorder in the cows following good (28.6%) and medium (25.73%) body conditions. The dairy cows at ages greater than nine (>9) years were more exposed to reproductive disease than those between five up to nine (5-9) years and three up to four (3-4) years with an occurrence rate of 39.62%, 30.82%, and 27.7% respectively. The value after processing appears below in Table 5.

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Table 5: Prevalence and association of reproductive problems in dairy cattle by breeds, age, parity, and body condition

Risk factor	Category	No. examined	No. positive	Prevalence	χ2 chi-square(P-value)
Breeds	Local	223	56	25.1%	
	Cross	161	65	40.37%	1.5102(0.219)
Total		384	121	31.51%	
Age	3-4years	65	18	27.7%	8.4783(0.014)
	5-9years	266	82	30.82%	
	>9 years	53	21	39.62%	
Total		384	121	31.51%	
Parity	Primiparas	77	16	20.8%	2.3922(0.122)
	Pluriparas	307	105	34.20%	
Total		384	121	31.51%	
Body	Poor	73	39	53.42%	23.6965(0.000)
Condition	Medium	241	62	25.73%	
	Good	70	20	28.6%	
Total		384	121	31.51%	

5. DISCUSSION

The present findings using the questionnaire survey in this study revealed the occurrence of the major reproductive problems in dairy cattle were mainly dystocia, retained fetal membrane, repeat breeder, prolapse of the uterine and vagina, anestrous, and abortion. The retrospective study (N=388) and regular follow-up (N=13) revealed that a total of 401 animals were included of which 127 (31.7%) of dairy cattle in the study areas were affected with either one or more reproductive disorders in the district. In this study (regular follow-up), dystocia, anestrous, and RFM were found to be the major reproductive health problems containing 23.1%, 15.4%, and 7.7% respectively.

The present study discovered overall prevalence of reproductive problems in dairy cattle in selected study areas is 31.2%. This was mostly in agreement with the report of Gizaw *et al*., [42], who reported 31.76% of reproductive health problems in smallholder dairy production in and around Nazareth town, Central Ethiopia, and relatively in agreement with the report of Gashaw *et al*. [47], who reported 33.59% of reproductive health problems in smallholder dairy production system in Jimma town Southwest Ethiopia and overseas Khan *et al*. [7], who reported 33.85% of reproductive disorders in dairy cattle under a semi-intensive system of rearing in North-Eastern India. However, a lower prevalence was recorded in the present study as compared to the findings of Dawit and Ahmed [41], Haile *et al*. [39], Mekibib *et al*. [48], and Fedhiko *et al*. [11], who reported the prevalence as 40.25%, 43.07%, 43.90%, and 66.15%, respectively in different parts of Ethiopia. This difference in prevalence might be due to sample size, natural factors like drought, environmental factors like topography and stress, breeds of the animals, lack of appropriate case book records with sufficient information, and

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variation in management system between the different areas of the studies.

In this study (retrospective study and regular follow-up) dystocia, retained fetal membrane, repeat breeder, prolapse of the uterine and vagina, anestrous, and abortion, were found to be the major reproductive health problems containing 9.5%,7.23%, 4.99%, 4.22%, 3.5%, and 2.24%, respectively. Dystocia was a higher-status reproductive problem of dairy cattle identified in the present study with a prevalence rate of 9.5%. The prevalence of dystocia observed in this study (9.5%) is fairly in agreement with the study of Kassahun [49], who reported 9.65% of major clinical reproductive problems of smallholder dairy cows in and around Awassa. However, the current study reproductive problems in dairy cattle are higher when compared with the results of Haile *et al*. [39] who reported a prevalence of 5.9% in Urban and Per Urban Areas of Hosanna, and Seid *et al*. [9] who reported a prevalence of 3.39% in West Hararghe Zone. This variation appeared in the case of dystocia might be because it is influenced by factors such as age and parity number; as well as breed of the sire [50; 51]. Similarly, genetic factors and nutritional factors such as metabolic diseases and feedings make the fats accumulate in birth canal bones, a hormonal imbalance that prevents the cervix from dilation, insufficient pelvic bone ligaments that initiate bone relaxation and inseminating dairy cattle with semen collected from imbalanced sized or large sized bulls without considering the size and age of dairy cattle is an important factor in the development of dystocia.

The prevalence of retained fetal membrane in the present study (7.233%) is in fair agreement with the findings of Haile *et al*. [39] who reported a prevalence of 7.18% in Urban and Per Urban Areas of Hosanna and Ambaw *et al*. [52], who reported the prevalence of the problem as 7.6% in Dessie and Kombolcha towns, South Wollo. However, the prevalence in this study area was lower than the findings of Alemselam *et al*. [53], Haile *et al*. [37], Degefa *et al*. [40], and Gashaw *et al*. [47], who reported 11.5%, 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, and vitamin and mineral deficiencies have been identified as causes of RFM [53; 54; 55; 56]. Other factors such as lack of ambient exercise, the pressure of environmental temperature, and lack of tonicity in uterus muscles also play a great role in retaining fetal membranes.

The prevalence of repeat breeding in the present study (4.99%) is in agreement with the findings of Ayisheshim *et al*. [57], who reported the prevalence of the problems as 4.5%. When assessed the problems with the findings of Dereje and Surra [4], Bitew and Shiv [34], Gashaw *et al*. [47], and Dawit and Ahmed [41], who reported a prevalence of 0.5%, 3%, 1.3%, and 3.87% respectively, a higher prevalence rate of repeat breeding was obtained in the current study. However, it is lower than when compared with the findings of Dinka [35], Alemselam *et al*. [52], Melese *et al*. [59], and Natnael and Haben [8], who reported a prevalence of 26.8%, 21%, 17%, and 15.1%, respectively. Repeated breeding can be caused by several 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 [60]. In addition to these, the communal use of bulls for natural services is also considered a contributing

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factor and abscess accumulation in the uterine body of uterus.

The prevalence rate of prolapses (uterine or vaginal) in the present study (4.22%) is in agreement with the study of Melese *et al*. [59], Ambaw *et al*. [52], and Natnael and Haben [8], who reported prevalence 3.3%, 3.5%, and 5.2% respectively from different part of Ethiopia. When assessed the problems with the findings of Gashaw *et al*. [47], Bitew and Shiv [34], Seid *et al*. [9], Dereje and Surra [4], and Benti and Zewdie [43], who reported a prevalence of 0.5%, 1.7%, 1.94%, 2.3%, and 2.7%, respectively, a higher prevalence rate of prolapses were obtained in the current study. Even though, it is lower than when compared the problems with the findings of Mekibib *et al*. [48] and Fedhiko *et al*. [11], who reported the prevalence as 7.32% and 5.47%, respectively in different parts of Ethiopia. The probable causes that raised prevalence rate of prolapses in the study area may be due to external pressure that contributed as predisposing factors like excessive traction of the fetus to relief dystocia or retained fetal membranes, dragging the fetus horizontally rather than downwards to the udder during parturition by assistant persons and excessive straining of the cows and pressure of uterine muscles considered as important causes for prolapses.

In the current study, anoestrus was found with a prevalence rate of 3.5%. These fairly agree with the findings of Abunna *et al*. [4], who reported a prevalence (of 3.7%), in dairy cows in Bishoftu town, and Wujira and Nibret [60], who reported a prevalence (of 4.8%) in Dairy Cows in Wolaita Sodo Town in Selected Farms. When assessed the problems with the findings of Fedhiko *et al*. [11], Bitew and Shiv [34], Seid *et al*. [9], and Dereje and Surra [4], who reported a prevalence of 1.82%, 1.66%, 1.69%, and 0.7%, respectively, a higher prevalence rate of anoestrus was obtained in the current study. Even though, it is lower than when compared the problems with the findings of Haile *et al*. [39], Ayisheshim *et al*. [57], and Alemselam *et al*. [53], who reported the prevalence as 10.26%, 6%, and 37.8%, respectively in different parts of Ethiopia. This variation might be due to age, faulty heat detection, breed, management system, and nutritional variation with environmental location.

In the current study, abortion was found with a prevalence rate of 2.24% which is fairly in agreement with the finding of Gizaw *et al*. [42], who reported 2.23% in and around Nazareth town, Natnael and Haben [8], who reported 2.6% in and Around Hawassa Town and Haile *et al*. [39], who reported 2.56% in urban and per urban area of Hosanna. On the other hand, Bitew and Shiv [34], Mesele *et al*. [58], Belay [62], and Benti and Zewdie [43] reported 13.9%, 14.5%, 10.6%, 11.7%, and 12.2%, respectively which are higher than the current finding in different parts of Ethiopia, but compared with the finding of Gashaw *et al*. [47] who reported a prevalence rate of 1% the current finding is higher. The difference in the prevalence of abortion may be due to variations in the practice of AI, genetics, nutritional status, infection, level of toxicities, and husbandry management systems in different areas. When the incidence of abortion is 2% or more it should be diagnosed soon to know its cause and viewed seriously [62].

Analysis of the prevalence of assessment reproductive problems in dairy cattle revealed that age had a statistically significant association ($p<0.05$) and the highest (39.62%) prevalence rate of major reproductive problems was obtained in age >9 years cows as compared with the prevalence of 5-9 years (30.4%) and 3-4 years (27.7%). This is because as the animals age, their immunity to overcome

disease condition decrease, and the body's cell function become weakened.

A body condition score of the study animals did influence the incidence of reproductive health problems in dairy cattle in the present study; incidence is higher in cows with poor body condition (53.42%) than medium (25.3%) and good (28.6%) body conditions, because of overfeeding and underfeeding expose the animals to various reproductive problems. The reproductive health problems showed significant variation in body condition scores. This is in agreement with the report by Ayana and Gudeta [62] who reported 44.7% in poor and 35.4% in good body condition. This occurrence of reproductive problems in various body conditions may be due to thinning, overfeeding, sample size, production system, literacy of the farmers, and breed as well as environmental factors. However, there was no significant association between different breeds and parity ($P > 0.05$) of cows in the current study.

6. CONCLUSION AND RECOMMENDATIONS

This study revealed that assessment of reproductive problems in dairy cattle such as dystocia, retained fetal membrane, repeat breeder, prolapse of the uterine and vagina, anestrous, and abortion, were found to be the major affecting performance of reproductive health problems. Hence, in the current investigation, the observation of a considerably higher prevalence of reproductive problems (especially, dystocia, retained fetal membrane, repeat breeder, prolapse of the uterine and vagina, and anestrous) recorded and the occurrence of the associated risk factors (like breed, age, parity, and body conditions) generally determine the importance of nutritional related constraints for profitable production of dairy cattle in the study area.

Consequently based on the above conclusion, the following recommendations are forwarded:

- ✓ Veterinarians and communities should be traceable to each other to control the occurrence of reproductive problems in dairy cattle.
- ✓ Reforming the management system to prevent the predisposing factors for reproductive problems in dairy cattle.
- ✓ Appropriate record keeping must be maintained and followed up through veterinarians and smallholder dairy producers.
- ✓ Training the community about the risk factors through veterinarians or animal health professionals.
- ✓ Best selection methods should be used by avoiding animals that have small pelvic girdles when buying animals from the market.

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