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Assesment on Major Reproductive Disorders of Dairy Cows in and Around Batu Town, East Shewa Oromia Region, Ethiopia

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Abstract: Reproductive efficiency is a critical component of a successful dairy operation and is still one of the most costly problems facing the dairy industry today. The study was conducted with the aim of assessing on major reproductive disorders in dairy cows in and around Batu town by employing questionnaire survey from 120 owners during the period of November 2014 to April 2015. From a total of 750 dairy cows presented in the study area, only 284 dairy cows which complained of reproduction disorders were selected to differentiate the major and minor reproductive problem. Abortion, repeat breeding, dystocia, retained fetal membrane, uterine and vaginal prolapse were the major reproductive disorders in the study area, the values were 24.29%, 18.3%, 14.78%, 13.03%, 9.85% and 9.5% respectively. Where anestrus and endometritis had low prevalence of 5.28% and 4.92% and were considererd the minor reproductive disorders in the study area. From 284 dairy cows studied the reproductive disorders with respect to breed included 77.8% of local breeds and 22.2% of cross breeds. Whereas the percentage of reproductive problems were 73.6%, 23.6%, 2.8% in parity 0-2, 3-5 and >5 respectively and the prevalence of reproductive disorders with service were 76.4% in case of natural service and 23.6% in case of artificial insemination. The majority of reproductive disorders were high in naturally bred cows and heifers as well as cows during the first two parity. Abortion, repeat breeding and dystocia were recorded as the main complimentary problems in the study area. The reproductive disorders in relation to breed, parity and service was studied and local breeds and heifers were more vulnerable for the major disorders and naturally breed animals were more affected than animals bred using artificial insemination. It can be concluded that, improvement in management systems such as (housing, feeding and health care), heat detection and proper selection of bulls for mating and using artificial insemination technology can minimize the reproductive health problems and hence, improve the reproductive efficiency of small holder dairy caws in the study area.

Key words: Batu · Dairy Cattle · Reproductive Disorders

INTRODCTION

Ethiopia is believed to have the largest livestock population in Africa. This livestock sector contributs a considerable portion to the economy of the country and still promising to rally round the economic development of the country. The total cattle population for the country is estimated to be about 53.99 million. Out of this, the female cattle constitute about 55.48 percent and the remaining 44.52 percent are male cattle. 98.95 percent of the total cattle in the country are local breeds and remaining are hybrid and exotic breeds that accounted for about 0.94 percent and 0.11 percent, respectively [1].

Ethiopia has an enormous livestock resource with total contribution of 15% gross domestic product and 33% of the agricultural output. Live stocks are the main

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stays of the livelihood of the majority of the human population of country by giving draft power supply for crop production and transport as a source of meat, milk and sources of cash income [2].

In contrast to the huge livestock resources, the livestock productivity is however, found to be very low. The major biological and socioeconomic factors attributing to the low productivity include the low genetic potential and performance, poor nutrition (in quality and quantity terms), traditional way of husbandry system and prevailing of different diseases [3].

Reproductive system is the interaction of central nervous system, hypothalamus, pituitary gland, gonads and their target organ and lead to estrous, ovulation, gestation and parturition finally give living animals (offspring). This process succeed when there is no any reproductive disorder [4]. The poor reproductive performance indicates the presence of reproductive problems resulted in considerable economic losses of small holder dairy farm and the dairy industry [5, 6]. Among the major problems that induce a direct impact on reproductive performance of dairy cows, the retained fetal membrane and subsequent endometritis and payometra had been reported to be the most common clinical and economic problems [7]. Reproductive problem (disorder) among farm animal cause great economic loss to the dairy industry due to slower uterine involution reduced reproductive rate, prolonged inter conception period and calving interval, high cost of medication, drop in milk production, reduced calf and early depreciation of potentially useful cow [8, 9].

It has also been shown that low reproductive efficiency hinders genetic improvement in zebu (bosindicus cattle and cause direct economic loss); in Ethiopian dairy cattle maintained under different reproduction system [10]. Reproductive disorders of the dairy animals in Ethiopia is a major problem, due to low genetic potential of indigenous cattle, poor nutrition, inadequate management, high disease incidence, parasite burden among the disease have numerous influence on productivity and fertility of herds, that is losses due to mortality and morbidity, loss of weight, slowdown of growth, poor fertility performance and decrease in physical power. The major problems that have a direct impact on reproductive performance of dairy cows were classified as before gestation (infertility or anestrus and repeat breeder), during gestation (abortion, vaginal prolapse and dystocia) and after gestation (retain fetal membrane and uterine prolapse) and the ultimate manifestation of infertility is the failure to produce offspring [11].

Anestrus is considered a symptom resulting from different conditions like the interval from puberty to maturity, gestation and after incomplete uterine involution and pyometra. Anoestrus which is symptom of infertility is a state of complete sexual inactivity with no manifestation of estrus for more than two month [12].

Repeat breeders are cow with normal or nearly normal estrus cycles and estrus period and estrous behavior but fail to conceive after two or several inseminations or natural breeding using fertile bulls. The pathogenesis of repeat breeding involves either failure of fertilization or early embryonic death [13].

Abortion is expulsion of dead fetus of recognizable size, after organogenesis and before full term of the gestation period. It is caused by noninfectious (chemical, drug, poison, hormones, nutritional disorder, trauma and genetics). Abortion also results from infectious agent like bacterial, viral, fungal and protozoa infections [14].

Dystocia is abnormal and difficult birth in which the first and second stage of parturition was markedly prolonged and subsequently found impossible freedom to deliver without artificial aid. The incidence of dystocia is greater in pregnancies that terminate early due to uterine disease, fetal death, twining or that terminates after prolonged gestation period due to excessive size of fetus. In general the causes of dystocia are grouped in to maternal causes such as uterine torsion, dropsy of fetal membrane, ventral hernia, fetal maceration and mummification, uterine and vaginal prolapses, uterine inertia and failure of cervical dilatation. The second is fetal causes which are abnormalities of pasture; position, presentation and fetal over size [15].

The vagina-cervical prolapse or protrusion of the vagina involves the floor lateral wall and portion of the roof of vagina through vulva and same times with cervix. The prolapses observed commonly after the last 2-3 month of gestation when large amount of estrogen is being secreted by placenta and it causes relaxation of pelvic ligament, vulva and vulvar sphincter muscle [15]. Shortage of calcium causes flaccidity of the muscle and when estrogen substance are present in ordinary amount in the diet and intra abdomen pressure of late pregnancy and gravity acting to force relaxed and loosely attached vaginal floor and well through the vulva [16].

The lack of expulsion of the fetal membranes with in the first 24 hour after calving is called retention of fetal membrane [15, 17]. It is basically due to failure of villi of fetal cotyledon to be detached from the maternal crypt of coruncles. It is caused due to shortage of blood supply to fetal villi followed by shrinking of both maternal and fetal placenta structure, degenerative change, strong urine

contraction, infection of uterus, during gestation, shortage of mineral and vitamin and disease causing uterine inertia or atony resulting in high incidences of retention of the fetal membrane [18].

Uterine infection such as metritis and endometritis, generally they are called uterine infection. Metiritis is the inflammation of the uterus whereas endometritis is inflammation of uterine wall [19].

Reproductive disorder of the dairy animals was broadly studied throughout the world, but studies in Ethiopia are limited and mainly located in the central high lands and in some parts of eastern and northern parts of the country: like in Mieso district, eastern Harary by Petros [20], in Welayta Sodo by Dembelo [21] in Mekelle by Aregawi [22], in Adaberga, by Dereje [23], in Kalmino Dairy farm Mekelle by Samson [24] and in eastern Tigray, Wukro [25-27]. But these studies were generally about reproductive health problem of cattle in general, little was done in case of the major reproductive disorders of dairy cows in and Around Batu Town Eastern Shewazone of Oromia Region. Hence, the present study was designed to identify the major reproductive problems and their risk factors, because dairy cows in this area are the main source of income for the smallholder peoples foundaround Batu town.Therefore, the objectives of this work were:

- To identify the major Reproductive disorders of dairy cows in the study area.
- To provide adequate information regarding to the incidence of various reproductive disorder in dairy cows.

MATERIALS AND METHODS

Description of Study Area: The present study was conducted from November 2014 toApril 2015 in and around Batu, East shewa Zone of oromia Region. Batu is found in Adami Tullu Jido Kombolcha district which is a part of Rift Valley that lies 167km south of Addis Ababa. The district is located between 38°20' and 38.5°5' E and 7°35'and 8°05' N.Geographyically, the area is located at an altitude of 1500 to 2000 meters a.s.l. It receives mean annual rainfall of 760mm. The area has maximum and minimum temperature of 27.2 and 12.7 respectively and relative humidity of 60%. The agro-ecological zone of the district is semi-arid and sub-humid in which 90% of the area is lowland while the remaining 10% is intermediate [28].

Study Protocol

Study Animal: From total number of 284 dairy cows used, including non-descript local and crosses of HF, Bark X HF, Jersey X local non-descript. Which are in the risk of reproductive disorder or compliant affect by one or more type of reproductive disorder like abortion, retained fetal membrane, repeat breeder, dystocia, anestrus and uterine prolapse as well as uterine infection was studied in and around Batu, accordingly the cattle maintained under semi-intensive, intensive and extensive management was includeed in the study. Small holder dairy farms found in and around Batuarea, kept under extensive and semi-intensive and animals at different age and productive status are all included in the study.

Study Design: The research was conducted from November 2014 toApril 2015 to estimate the overall major reproductive disorders in selected areas of Batu Wereda using questioner formats. The questionnaire format was prepared to interview livestock owners on purposively selected areas by simple random sampling method interviewed 120 animal owners, farm managers and technicians

Study Methodology: This study was undertaken by applying questionnaire survey in the study area. The disorders were determined with respective risk factors like age, parity and breed andtype of service.

Questionnaire Survey: Questionnaire survey was designed to cover a wide range of issues pertaining to dairy cows. The author personally interviewed the respondents in the local language and records their responses. The respondents were cow owner who were lives in and around Batu, the dairy farm managers found in and around Batu and technicians and their responses were recorded.

A detailed and organized questioner format (Annex 1) was designed and generates base line information of causes of reproductive problem in dairy cows, with particular emphases on major reproductive disorders in and around Batu, East shewa Zone of oromia Region. In the survey information on reproductive health as well as management system was conducted. The data collected includes type of dairy husbandry system, breed, parity, age, type of service, if any abnormal discharge from genitalia, pervious exposure from any disorder.

Data Analysis: The data collected were entered in to a MS-Excel spread sheet and coded appropriately and analyzed used appropriate statistical procedure for social science (SPSS software version 20). For data analysis descriptive statistics were used. *P*-value of less than 0.05 was considered to be significant using 95% level of confidence.

RESULTS

In the present study, of all dairy cows studied (n=750), 284 animals had one or another reproductive disorder. The major reproductive disorders were abortion, repeat breeding, dystocia, retained fetal membrane, uterine and vaginal prolapse with percentage of 24.29% (n=69), 18.3% (n=52), 14.78% (n=42) 13.03%(n=37), 9.85%(n=28), 9.5%(n=27) respectively. Besides, anoestrus 5.28 % (n=15) and endometritis 4.92(n=14) were recorded as the minor reproductive disorders in the study area.

The occurrence of reproductive disorders in the study area in relation to breed (local and crossbred), reported a total of 221 animals which included 29.46 % of local and 8.4% of cross bred animals (Table 2). Among these all disorders were abortion, endometritis, anoestrus and vaginal prolapse was high in local breeds. However the retained fetal memberane, repeat breeding, dystocia and uterine prolapse were the most prevalence in the cross breeds.

Table 1: Frequency of major reproductive disorders in the study area

Type of disorders	Frequency	Percent (%)
Abortion	69	24.29
Retain fetal membrane	37	13.03
Repeat breeding	52	18.3
Dystocia	42	14.78
Endometritis	14	4.92
Anoestrus	15	5.28
Uterine prolapse	28	9.85
Vaginal prolapse	27	9.5
Total	284	100

Table 2: Reproductive disorders with respect to breed

	Breeds				
	Local		Cross		
Type of disorders	Frequency	Percent	Frequency	Percent	p-value
Abortion	58	26.24	11	17.46	0.369
Retain fetal membrane	28	12.67	9	14.3	0.026
Repeat breeding	40	18.09	12	19.04	0.017
Dystocia	31	14.03	11	17.46	0.006
Endometritis	11	4.97	3	4.76	0.310
Anoestrus	12	5.42	3	4.76	0.378
Uterine prolapse	19	8.6	9	14.28	0.001
Vaginal prolapse	22	9.95	5	7.9	0.339
Total	221		63		

Table 3: Type of disorders in relation to service (AI and NS)

	Service				
	Ns		AI		
Type of disorders	Frequency	Percent	Frequency	Percent	P-value
Abortion	58	26.7	11	16.4	0.002
Retain fetal membrane	28	12.9	9	13.03	0.003
Repeat breeding	39	17.79	13	19.4	0.376
Dystocia	30	13.82	12	17.9	0.262
Endometritis	10	4.6	4	5.97	0.304
Anoestrus	12	5.53	3	4.47	0.449
Uterine prolapse	19	8.75	9	13.43	0.268
Vaginal prolapse	21	9.67	6	8.95	0.714
Total	217		67		

Table 4: Reproductive disorders with respect to parity

	Parity						
	0-2		3-5		>5		
Type of disorders	F	P	F	P	F	P	P-value
Abortion	55	26.3	11	16.4	3	37.5	0.002
Retain fetal membrane	32	15.3	5	7.46	0	0	0.003
Repeat breeding	36	17.22	14	20.89	2	25	0.376
Dystocia	30	14.35	11	16.4	1	12.5	0.262
Endometritis	7	3.34	7	10.04	0	0	0.304
Anoestrus	11	5.26	4	5.97	0	0	0.449
Uterine prolapse	20	9.56	8	11.94	0	0	0.268
Vaginal prolapse	18	8.6	7	10.44	2	25	0.714
Total	209		67		8		

The occurrence of reproductive disorders in the study area in relation to service (AI and NS), observed a total of 217 animals, from which 28.9% breed naturally and 8.9% cross bred animals were inseminated artificially. This result indicated that the reproductive disorders are more prevalent in animals bred naturally and this may be due to high risk of diseases transmissible through natural service (bull) and relatively poor husbandry and management practices in the local bred animals kept extensively (Table 3).

The results in Table (3) indicate that abortion, anoestrus and vaginal prolapsed have high percentage in the dairy cattle bred by natural service and retain fetal membrane, repeat breeding, dystocia and uterine prolapse was higher in dairy cattle bred using artificial insemination this may be due to the sexually transmitted diseases which are common in uncontrolled natural breeding.

The incidence of reproductive disorders in relation to parity (Table 4), shows high prevalence of disorders like abortion, repeat breeding and vaginal prolapse in case of pluriparus cows and disorders like retained fetal membrane and dystocia were seen relatively common in heifers. This indicates that the smallholders which are kept dairy animals are not well oriented about the management mainly feeding of female heifers and pregnant animals or these animals were attaining pubertal age very late or are with poor body condition heifer and cow and this may cause maternal as well as fetal causes of dystocia as well as postpartum reproductive disorders such as retained placenta.

DISCUSSION

From 120 dairy breeders, a total of 750 dairy cows were assessed for the prevalence of major reproductive disorders through questionnaire survey in and around Batu town, randomly in different kebeles. From these dairy cows 284 (37.86%) were the complaints of reproductive disorders. Based on the objective of the study, the 284 animals were included in the study to know or differentiate the major and minor reproductive disorders.

Of all the 284 dairy cows with compliant of reproductive disorders the majority of animals were local dairy cows 221(77.8%) and around 22.18% of the affected animals were cross breeds. The current results indicated that the reproductive disorders are more prevalent in local breeds and this may be due to high risk of diseases transmission through uncontrolled extensive management and relatively poor husbandry and management practices This study was conducted not only in breed but also based on type of service and parity for different type of reproductive disorders. Majority of the reproductive disorders 217(76.4%) were obtained from animals bred by natural service and the remaining 23.6% of disorders recorded in the study were from animals serviced through artifical insemination as indicated before [25]. This result indicated that animals getting service naturally are more vulnerable for many reproductive disorders and this may be due to the reason that naturally serviced animals are more exposed to different venerial diseases and other pre and postpartum reproductive disorders.

Reproductive disorders like abortion and uterine infections were more prevalence in naturally bred cows, whereas retention of fetal membrane and repeat breeding were recorded more prevalent in artificially inseminated cows this findings show the influence of service on the disease prevalence and this may be due to an controlled mating and un hygienic conditions of the service, artificial inseminators efficiency as well as heat detection problems which leads to poor conception rate and as a result leads to repeat breeding. Luck of infrastructure such as transportation and insufficient veterinary services in the

study area are also contributing factors to the high occurrence of reproductive disorders mainly in the extensive management system. The prevalence of dystocia, anestrus and retained fetal membranes for all complaints in both types of services were almost similar.

The prevalence of abortion (24.29%) retained fetal membranes (18.3%) and Dystocia (14.78%) was recorded as the main complimentary problem in the studied cows this may be due to the poor husbandry system practiced high use of natural breeding and poor service delivery system in the study area. Reproductive performance of dairy cattle appears to be declining this has been associated with the increasing production potential of cows not being met by increasing nutritional inputs. Anestrous is the main factor that negatively affects reproductive performance of animals bred in this area. Underfeeding which is common in this condition accompanied by imbalance feed causes reduction of in weight gain delay in onset of puberty and abnormal reproduction and production in animals Obese, over-conditioned dairy cows are prone to "fat cow syndrome" at calving which have an adverse effect on fertility. Obesity due to overfeeding has been considered as a cause of infertility in cattle [29]. The overall prevalence of reproductive disorders from those all affected animals with reproductive disorder complaints were 24.29%, 18.3%, 14.78%, 13.03%, 9.85%, 9.5%, 5.28%, 4.92% for abortion, repeat breeding, dystocia, retention of fetal membranes, uterine prolapse, vaginal prolapse anoestrus, endometiritis respectively. The currently mentioned results disagree with others who mentioned much less prevelences [30] Which could be referred to the different sampling methodology, which related the reproductive disorders to all the studied population whereas, this study distributed the observed disorders of only the problem dairy cattle.

The prevalence of abortion from all of the complaints with reproductive disorders was 24.26 %, which is not similar with the results (2.23%) reported by Gizaw *et al.* [31] the difference is due to sample size and methodology of sampling. but almost similar with Tekley *et al*. [32], who reported 20.3%. From the complaints abortion was 26.24% in local breeds and 17.46% in cross breeds. The reason for the high percentage in local breed than cross breed was due to the high number of local breed used from the study area, poor management, low plan of nutrition, Prevalence of major reproductive problems in smallholder dairy cows in and around Nazareth town were reported to be endometritis, retained fetal membrane (RFM), repeat breeding and dystocia as major clinical reproductive problems with prevalence rates of 16.63%, 12.91%, 8.91% and 6.95%, respectively Gizaw *et al.* [31] which is in agreement with our study. Abortion (2.23%), anoestrus (1.48%) and prolapses (1.24%) were minor clinical reproductive problems observed in smallholder dairy cows in and around Nazareth which is not in agreement with the present study.

From all of infected (284)animals with complaint of reproductive disorders, repeat breeding has prevalence at 18.3% found in the present study which is greater than 13% reported by Micheal, [33] in and around Hawassa and also greater than 13.08% reported by Adane *et al*. [34] urban and pre-urban of Hossana the variation is because of sample size sampling methods. The prevalence of repeat breeding was 19.4% cows inseminated by AI and 17.97% bred by bull (natural service). 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.

Dystocia has a prevalence of 14.78% in the present study is in contrast to other studies which reported 5.79 % in and around Debre Zeiet[35], 3.8% [36] and 2.9% [37]. This variation in the occurrence of dystocia may be due to the fact that it is influenced by the factors such as, age and parity of the dam as well as breed. Inseminating cows with semen collected from large sized bulls without taking into account the size and age of cows is an important factor in precipitating dystocia [38]. The incidence of dystocia was high in cross breeds (17.46%) than local breeds (14.03) in the study area with statistically significant ($P<0.05$).

Dystocia was also found to be high in AI (17.9%) than N.S (13.82%). The size of the calf was high in AI due to this it is difficult to calving large fetus through the small pelvic size. It is similar with the study by Johnson *et al*. [39].

The prevalence rate of RFM (13.03%) in recent study is similar with the (14.28%) was reported [35] higher than 8.6% reported by Molalegn and Shiv [40], but lower than 19.2% by Gashaw *et al*. [36]. The prevalence of RFM was high in cross breeds (14.3%) than local breeds (12.67%) and high in AI (13.43%) than (12.9%) in NS due to transmission of disease during service. The variation in the incidence of RFM may be attributed to variations in predisposing factors to which the animals are subjected to; among which include nutritional status and management such as lack of exercise. The prevalence

rate of RFM in the current study could also be due to dystocia that accounted 5.9% of the problems, which is an important predisposing factor for occurrence of RFM and higher report by Gashaw *et al.* [36] it is statistically significant ($P<0.05$) with breed and services.

The prevalence of anestrus observed in study area was (5.28%) which is in agreement with the result of Kidsan [25] which reported (7.6%). And disagree with Hadush *et al*. [37] who reported 12.9% in dairy cattle in debre Zeit. The prevalence of anoestrus from the complaint was (5.42%) from local breeds and (4.76%) from the cross breeds this variation might be due to the age, faulty heat detection, breed and management system differences.

The prevalence of endometritis of the reproductive disorder of the study area in and Batu town was (4.92%) agree with the (3.21%) prevalence reported by Berihu and Abebaw [41] in study of small holder dairy cows in and around Bako. The prevalence in study area was lower than the prevalence values (13.8%) documented by Erb and Martin [42]. The variation in the prevalence of endometritis is probable due to difference in the management system, study methodology and sample size.

The present study the prevalence of vaginal prolapse from all reproductive disorders in study area was (9.50%) greater than as compared reported by kidusan [25] which is (5.2%). In case of breeds (9.95%) are local breeds and (7.9%) of cross breeds still it is higher than reported by Kidusan which is 3.9% for local and 6.5% are for cross breeds. This variation could be due to inter relationship between reproductive problems as predisposing factors for each other, number of local cows are greater than cross breeds in the present study area.

The prevalence of uterine prolapse from all complaints of reproductive disorders in the study area was (9.85%) in and around Batu town which 9.56%, 11.94% in a parity grouped animals of 0-2, 3-5 and no result in case of >5 respectively. The result of the study area were not similar with reported by Kidusan [25], which was 2.4%, 4.3% and 6.2% grouped animal 0-2, 3-5, and greater than 5 respectively. The difference was due to the number of animal used for each study (population) in study area.

CONCLUSION

Reproductive efficiency is a critical component of a successful dairy operation whereas reproductive inefficiency is one of the most costly problems facing the dairy industry today which occur frequently in lactating dairy cows and can dramatically affect production of the dairy herds. Abortion, repeat breeding, dystocia, retained fetal membrane, uterine prolapse and vaginal prolapse were major reproductive disorders while anoestrus and endometritis were the minor reproductive disorders in the present study area. Poor nutrition, inadequate management, low genetic potential of indigenous cattle, natural service and disease incidence has numerous influences on productivity and fertility of dairy herds. There is considerable controversy among veterinarians and dairy producers whether to breed, treat, or cull dairy cows exhibiting one or more of these reproductive disorders regarding the economic impact of dairy operation.

Based on the above conclusions the following recommendations are forwarded:

- Most of the reproductive health problems prevalent in the study area affects animals bred with natural service due to the presence of sexually transmissible diseases (STD), so that strict awareness and extension education should be practiced, not to use the same bull to many cows and if any treat accordingly
- AI should be practiced and encouraged in smallholder dairy cow with Provision of proper veterinary services and frozen semen in terms of quality and quantity
- The animal health workers (veterinarian, assistants and technicians) should work in the direction of prevention and control by practicing awareness creation about the management of heifers, pregnant cows, fresh cows and the heat signs/detection for minimizing the occurance of abortion, repeat breeding and dystocia conditions.
- Dairy producers and farmers should work closely with veterinarian to develop management strategies and discuss appropriate interventions when necessary.

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