Journal of Reproduction and Infertility 9 (3): 56-62, 2018
ISSN 2079-2166

DOI: 10.5829/idosi.jri.2018.56.62

Major Reproductive Health Problems of Dairy Cows in and Around Hirnatown, Eastern Ethiopia

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Abstract: A study was carried out in Hirnatown and its surrounding Kebeles, Tullo district, Western Hararghe zone of Oromia region. The objectives of the study were to determine the major reproductive health problems of dairy cows of the area, their respective prevalence and associated risk factors. The Study method used for this research was questionnaire survey and regular follow up. From the total of three hundred eighty four (n=384) dairy cows, 353 local breed and 31 cross- breed of dairy cows were included in the study. Using questionnaire survey (n=367) and regular clinical examination (n=17). Of the total dairy cows examined, 47.4% (n=182) were found to be affected with one or more reproductive health problems. Dystocia, repeat breeder, retained fetal membrane and abortion were found to be major reproductive health problem of the area with prevalence of 12.76%, 10.68% and 7.29%, respectively. Logistic regression revealed that hygienic condition and body condition were found to be influence significantly (P<0.05) the overall of prevalence of reproductive health problems. Higher prevalence was observed in unsatisfactory hygienic condition (65.5%) and in poor body conditioned animals (61.5%). But other associated risk factors like age, breed and management system were not found to be significantly (P>0/05) affecting the occurrence of reproductive problems. The study revealed high prevalence of major reproductive health problems in Hirna town and surrounding kebeles. Therefore, it is recommended that feeding, housing and health management should be improved to minimize the occurrence of reproductive health problems and associated economic losses in this study area.

Key words: Reproductive Problems · Dairy Cows · Prevalence · Risk Factors · Hirna

INTRODUCTION

Animal production has been considered as the main component of agricultural development in most part of sub-Saharan Africa. Ethiopia is known for its huge livestock population, being the first county in Africa and tenth in the world in which the recent livestock population estimates that the country has about 44.3 million heads of cattle, 23 million of sheep and 23.3 million of goats [1]. However, the country's per capita milk consumption is estimated to be about 19.2kg per year [2]. This low per capital milk consumption is mainly emanated from poor genetic potential of local cattle for dairy farms. Selection for high milk production within indigenous cattle would require a long term genetic improvement program [3].

Nutritional effect on reproductive performance is reported as the breeding efficiency of a dairy herd which cannot be maintained at a high level without proper nutrition [4]. Feed more than any factor determines the productivity and profitability of dairy cows. Approximately 25% of the difference in milk production between cows is due to heredity; the remaining 75% is determined by environment factors, with feed making up the largest portion. Milk production declines linearly with the increasing forage for high producing dairy cows [5].

Livestock management should always include some method to monitor continuously the reproductive performance of any herd [6]. In Ethiopia as parts of the same efforts, the per-urban and urban dairy business have proliferated; the small holder dairy farmers are now

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serving as the main suppliers of milk and by products to the population. However, closer examination showed that they have faced several constrain and reproductive problems. Upon closer of the reproductive process in dairy cattle, the peak of milk production, uterine involution, resumption of the ovarian activity, reception and the greater risk to infection [7].

In female cattle, the cases of infertility are many, which cause the greatest economic impacts. The pregnant animals kept under careful observation when they are approaching parturition and after seeing the symptoms of parturition (developed udder and enlargement of vulva). The pregnant animal is kept in a calving pen with sufficient of soft straws [8].

The concentrate feeding should be given separately to the animals near parturition with extra rations developing the previous production of the animal. The calved animal should be kept Warm. The cow should be given plenty of Luke warm water to drink. The cow may be washed with clean water and sufficient quantity of green grass and food is supplied. After parturition due to straining some times prolapsed of uterus or vagina is seen. Sometimes heavy milking cows will show the symptom of milk fever which has to be formed retained placenta in such cases it is removed manually after 24 hours [9].

In developing parts of the world, most of the reported on the constraints of dairy cattle production focused on the work performed in research stations and institutional herds and thus had little bearing to the production conditions of the flourishing small holder dairy farms. There is a general paucity of information on reproductive problems and associated risk factors of dairy production conditions [10].

There fore the objectives of the current study were:

- To estimate the prevalence of major reproductive health problems and
- To identify major risk factors associated with occurrence of reproductive health problems

MATERIALS AND METHODS

Study Area: The study was conducted in Hirna town and surrounding kebeles. Hirna is located in the eastern part of Ethiopia and region, Western Hararghe Zone and Tullo district at about 375 km far from Addis Ababa having latitude of 13°6' north and longitude of 41°6' to the East at an altitude of 1762 meter above sea level.

The annual rainfall is 600-900 millimeter with the average 750 millimeters and the temperature is 17°C-32°C with average of 24.5°C. The agro-climate of the woreda and town is Semi lowland (53%) and Highland (47%).

The livestock population of the woreda is 119,422 cattle, 13,177 sheep, 37,973 goats, 337 horses, 269 mules, 5,790 donkey and 71,499 poultry with human population of male 83,63,674 and female 78,341 totally 162,015 in the woreda. The farming system of the woreda is mainly extensive management system and the major crops grow in the area are bean, sorghum, teff, wheat, barley and others.

Study Population: The animals that were used for this study include only female cattle (cows). A local and cross breed were considered under the study. The feeding and management system of dairy cows were determined.

Study Type and Design: The study animals were dairy cows raised in different areas around Hirna and the retrospective type of study was used. The study constitutes questionnaire survey and regular follow-up.

Study Methodology

Questionnaire Survey: In the questionnaire survey owners of the cows found in different kebeles were randomly selected and interviewed with a semi-structured questionnaire. The relative risk factors such as breed, body condition, age, hygienic conditions, parity and management systems were recorded. Husbandry cows kept under small holder dairy production system and private farm owners were also included.

Follow up Study: In the follow up study pregnant and calved cows were included by personal observation and clinical investigation of the animals as well as the evaluation of management condition of the farm twice a month. The observation was made on major reproductive problems such as dystocia, abortion, stillbirth, retained fetal membrane, repeat breeder, anoestrus and mastitis. During this study, hygiene of the farm, health problem of the farm, health problem of the cows, body condition of the cows and regular exercise of the animal were visited.

Sampling Size and Sampling Method: Three hundred eighty four (n=384) dairy cows from both cross and local breeds, at prepartum and postpartum periods were included. The purposive sampling method was employed to select the study farms and small holder production

system and data was collected on the overall reproductive history of dairy cows. The sample requires for this study was determined using the formula given as follows [11].

$$n = 1.96^2 \frac{(pexp)\,(1\text{-}pexp)}{d^2}$$

$$n = \frac{1.96^2(0.5(1\text{-}0.5)}{(0.05)^2} = 384 \text{ cattle}$$

where,
n=sample
P= expected prevalence (50%)
d=desired level of precision (5%)

There was no study conducted on the prevalence of reproductive health problems in this study area. Therefore, 50% expected prevalence was used to estimate the sample size. Using 50% expected prevalence, 95% confidence interval and 5% level of precision, the number of dairy cows needed to demonstrate the prevalence of major reproductive health problems in Hirna town were 384. Both local and crossbreed of dairy cows, which were kept under different management system of private owners and farmers, were investigated. Dairy farm owners were interviewed using questionnaires and data were collected on individual cow's reproductive status and /or 367 dairy cows were included in this survey. Regular clinical examination or personal observation of pregnant cows during late pregnancy, parturition and postpartum conditions were considered and 17 dairy cows were included in the follow up study.

Data Management and Analysis: The collected data was sorted and coded before processing. The prevalence of reproductive health problems were determined as the proportion of the affected animal out of the total animals examined. During processing, the data was summarized on the data Excel spreadsheet and STATA Corp (2009) software. Logistic regression were used to assess the effect of risk factors such as age, breed, parity number body condition score, hygienic condition and management system of the cows on the prevalence of reproductive health problems. In all the analysis, *P*-value <0.05was considered to have a significant difference.

RESULTS

Overall Prevalence of the Reproductive Health Problems: Out of three hundred eight four (384) cows, one hundred eight two (182) cows were found to have reproductive health problems in the area with an overall prevalence of 47.4%. The largest proportion was observed during questionnaire survey as compared to what recorded during the follow up study (Tablel).

Relative Frequency and Individual Prevalence of the Reproductive Healthproblems of Dairy Cows: The major reproductive health problems of dairy cows encountered in the Hirna were dystocia, retained fetal membrane, abortion, stillbirth, mastitis and anoestrus represented with 12.76%, 10.68 and 9.11%, 7.29%, 3.38%, 2.34% and 2.08% respectively. In addition, from all cows having reproductive problems, dystocia, repeat breeder, retained fetal membrane, abortion still birth, mastitis and anoestrous cases counted for prevalence of 26.37%, 22.52% and 19.33%, 15.38%, 7.14%, 4.95% and 4.4% respectively. Dystocia, repeat breeder, retained fetal membrane and abortion were the major reproductive problems in the area compared with others (Table 2).

Table 1: The overall prevalence of reproductive health problems of dairy cows in and AroundHirna town

Method of study	Total Cows Examined	Number of cows without problems	Number of cows With problems
Regular follow up	17	11 (2.86%)	6 (1.56%)
Questionnaire survey	367	191 (49.74%)	176 (45.83%)
Total	384	202 (52.6%)	182 (47.4%)

Table 2: The relative frequency of major reproductive health problems of dairy cows with their respective prevalence

Major problems	No. of affected Cows	Prevalence(%) as per cows examined	Prevalence(%) from total affected cows
Abortion	28	7.29	15.38
Dystocia	48	12.76	26.37
Still birth	13	3.38	7.14
Retained fetal membrane	35	9.11	19.23
Repeat breeder	41	10.68	22.52
Mastitis	9	2.34	4.95
Anoestrous	8	2.08	4.4
Total	182	47.64	100

Table 3: Prevalence and associated risk factors of the reproductive disease in extensive and semi- intensive management system of dairy cows

Risk factors	Total number of cows examined	Number of affected cows	Prevalence (%)	95% confidence interval	p-value
Hygiene condition					
Satisfactory	318	139	43.7	36.9-50.2	-
Unsatisfactory	66	43	65.5	49.3-86	0.016
Breed					
Local	353	165	46.8	40.2-53.5	-
Cross	31	17	54.8	32.2-81	0.465
Age					
≤ 7	265	108	40.6	34-46	-
> 7	119	74	62.1	30-68	0.887
Management					
Extensive	367	174	47.4	40.8-53.9	-
Semi-intensive	17	8	47	18.7-87.1	0.944
Parity					
1	56	21	37.5	24.6-50.3	-
2&3	294	146	49.7	34.8-56.1	0.667
>3	34	15	44	27.1-61.1	0.53
Body condition					
Good	305	130	42.6	35.8-49.4	-
Medium	66	44	68.1	49.5-86.7	0.015
Poor	13	8	61.5	33.9-89.1	0.082

The Influence of Risk Factors on the Prevalence of Reproductive Health Problems: Hygienic condition in the study area was observed to have significant (P<0.05) influence for the occurrence of major reproductive problem. Moreover, good body conditioned animals were seen to be affected less frequently than those with medium and poor body conditioned ones (P<0.05). Other factors like age, parity, management and breed was not observed to have a significant (P>0.05) effect on the occurrence of reproductive health problems (Table 3).

DISCUSSION

In the present study, the major reproductive health problems of local and cross cows were assessed with its associated risk factors. Accordingly, out of the total cows (n=384), 47.4% were found to be affected with reproductive health problems. The prevalence of major reproductive health problems reported in the study was found to be higher than 33.59% previously reported [12] and lower than 67.8% comparing with pervious findings [13]. This variation in prevalence might be due to the difference in breed of animals, management and environmental factors. Of the total cows examined for reproductive health problems, dystocia, repeat breeder, retained fetal membrane and abortion were the major reproductive health problems with the prevalence of 12.76%, 10.68%, 9.11% and 7.29% respectively whereas still birth, clinical mastitis and anoestrus were the major reproductive health problems with prevalence of 3.38%, 2.34% and 2.08% respectively in the area.

The prevalence of dystocia in the current study was accounted for 12.76% which is quite higher than earlier findings [14 - 16] with the prevalence of 6.6%, 3.8% and 3.1%, respectively. These variation could be attributed to parity, age, breed of sire and inseminating cows; while semen collected from large sized bull is an important precipitating factor for dystocia if is inseminated to cows which are un-proportionally small in size [17].

In the current study, the prevalence of repeat breeder accounted for 10.68%, which was higher than the earlier report of Ahrar [18] and Erb and Martin [19] who reported prevalence of 6.2% and 1.3% respectively. The variation in the prevalence of repeat breeders might be due to a number of factors including: malnutrition endocrine imbalance, reproductive tract infection, poor management practice such as incorrect timing insemination, faulty heat detection [20].

In the current study the prevalence of retained fetal membrane was 9.11% which revealed to lower than what was reported by Shiferaw *et al.* [21] and Bitew and Prasad [22] with the prevalence of 17% and 14.7% respectively. This may be due to the variation in nutritional status and management of the animals in the different farms. However, a prevalence of 8.6%, 10% and 5-8% agree with the current study [23-25].

The prevalence of abortion recorded in this study was 7.29% which is consistent with the previous reports [26-28] with the prevalence of 6.3%, 5.96% and 5.9%, respectively. However, the current study found a contrasting prevalence of abortion as compared to the reports of Smith *et al* and Brittand Kumarand Kumar [29- 31] who revealed prevalence of 1%, 2.23% and 13.9%, respectively. The variation in the prevalence of abortion in the different settings might be due to variation in breed and geographical location. Moreover, pathogens which can cause abortion may vary from farm to farm in different localities of the country.

In this study, the prevalence of still birth of 3.38% agree with a study conducted in Bedelle town by Johanson and Berager [32] who reported prevalence of 2.8%. Anoestrous, which is absence of estrus, is one of the reproductive problems of dairy cows. The current prevalence in this study was 2.08% which is less than the prevalence of 38.6% and 10.7% [33, 34] respectively, but greater than the prevalence of 0.3% [35]. This variation may be due to undetected heat symptoms in normal cow, which is resulted from failure for proper observation of estrus and inability to keep adequate records and unfamiliarity of the cow with symptom of estrus.

The prevalence of clinical mastitis in the current study was 2.34% which is one of the most important factors to decrease the productivity and profitability of farms through culling of affected cows which ultimately decreases the herd size. The prevalence of mastitis in Ethiopia reported by Lemma, kassa and Tegegn [36] was in range from 1.2% to 21.5% [37] and Workineh *et al.* [38] indicated the prevalence of mastitis 19% to 46.6% and 35.4%, respectively. This difference in the prevalence may be due to the study methodology used where in the present study only clinical mastitis was considered. Other factors that may contribute for the difference in the prevalence rates include variations in management system and hygienic conditions.

CONCLUSION

The present study revealed a high prevalence (47.4%) of major reproductive problems. The health problems observed in the area include: dystocia, repeat breeder, retained fetal membrane and abortion were the major ones. Whereas, still birth, mastitis and anoestrus are still minor ones. Hygienic condition and body condition were possible risk factor descried for the occurrence of reproductive health problems in the study area. So, this study tried to point out the magnitude of major reproductive health problems, their respective prevalence and the association of these problems with their risk factors.

Based on the above conclusion, the following recommendations are forwarded:

- Farm owners in the area should take care for proper hygiene, feed and treatment of animals to minimize the occurrence of reproductive health problems
- Proper detection of heat should be practiced in the area to decrease the economic loss associated with prolonged calving interval
- Dairy farm owners should be educated on proper husbandry of their animals.

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