Full Length Research Paper

Assessment of the problems associated with artificial insemination practices in Essera Woreda, Dawuro zone, Southern Ethiopia

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This study was conducted to assess the problems associated with the artificial insemination service in Essera woreda of Dawuro zone, southern Ethiopia from December, 2016 to August, 2017. The study was conducted using questionnaire survey and records in targeted human and dairy cow's population, respectively. There was no statistically significant association (P>0.05) in the conception and delivery of cows with different risk factors. But the management of the cows showed significant association (P<0.05) with their conception and delivery. There was no statistically significant difference (P>0.05) in weekends artificial insemination service among studied kebeles. However, there was a statistically significant difference among the studied kebeles in shortage of artificial insemination technician and inputs (P<0.05). The major animal health problem identified by dairy cow owners was conception failure (39.1%) followed by mastitis (23.4%) and mixed (mastitis and calving problem) (20.3%). A total of 58 (90.6%) of the respondents were not satisfied with the overall artificial insemination service. In addition, equal percentage of non-satisfaction levels of respondents were recorded in Ofa and Guza kebeles (93.8%). The result of the present study indicated that dairy cow owners were not satisfied with artificial insemination service and the service is not doing well in all kebeles of the of study site. Therefore, an immediate action is required to change the problem facing artificial insemination service in the study area and to achieve maximum benefit from the sector.

Key words: Essera woreda, artificial insemination, assessment, households.

INTRODUCTION

Artificial insemination recognized as the best biotechnological technique increasing reproductive capacity in farm animal its widely applicable in dairy farming enterprise (Mugerwa, 1989). The use of artificial insemination plays an important role to increase the yielding capacity of cows hence; it is the most appropriate and cheapest way of genetic improvement (Malafosse, 1990). Poor countries like Ethiopia also provide adequate AI service to improve productive efficiency over the last 30 years (Webb, 2003), hence, economically benefit from

the dairy enterprise IAEA (2007).But, poor heat detection skill by the owner of the animal, inconsistent service, and incorrect timing of insemination are some of the factors that limit the success of artificial insemination program (Wold et al., 2011). Wrong selection of AI bulls, poor motivations and skills of inseminators are also factors that limit success rate artificial insemination service (Samre et al., 2015). Artificial insemination service has been under progressive implementation in Essera woreda of Dawuro zone, over the last decades. Nonetheless, scientific studies have not been undertaken so far to assess the efficiency of AI services and key challenges influencing its success in small holder dairy cows managed under natural extensive production system. Therefore, the objective of this study is to assess major AI service constraints in the Essera Woreda; to in sight the conception and delivery of cows after AI using record data and to generate base line data for Essera woreda animal and fishery development office about artificial insemination service.

MATERIALS AND METHODS

Study area

The study was carried out in Essera Woreda of Dawuro zone, which is located between 6.7 to 7.02^{0} latitudes and 36.7 to 37.1° longitudes. Essera woreda with its capital at Bale town is situated 536 km south of the capital city, Addis Ababa. The Woreda has a total area of 1043.1 km^2 and is divided into 29 kebeles. The altitude of the district ranges from 501 to 2500 meters above sea level. The area receives an average annual rainfall of about 1600.5 mm and the annual average ranges from 17.6 to 27.5°C. Mixed farming system is the main economic activity practiced in Essera Woreda as indicted by EWARDO (2013).

Study population

Artificial insemination technicians (AITs), animal health professional and dairy cattle owners from four randomly selected kebeles were represented in the human study population. While, secondary data from dairy cows record in the selected study sites were also incorporated as animal study population.

Study design

The study was conducted using both cross-sectional and retrospective type of study. The cross- sectional types of study was conducted using questionnaire survey on human study population. A total of 64 randomly selected respondents (16 from each kebele) were included in this assessment study. The retrospective part of study was conducted using records from selected AI center in four kebeles of Essera woreda. Seventy four dairy cow's records (20 cows from Ofa kebele and 18 cows from the remaining kebeles) were considered.

Study methodology and methods of data collection

Structured questionnaire were prepared to interview dairy cattle owners and AITs to collect primary data in the assessment AI service and constraints in the study area. In due processes, briefing and explanation of the objective of the study were made to every respondent before presenting and asking the actual question. Then, the questionnaires were presented to each respondent. In addition, secondary data from records of AI service center were made on 74 dairy cows in selected Kebeles about the conception and delivery information by considering district, age, breed, body condition and management of the cows. The AI services in the study area were accompanied by public servants (government civil servants) and dairy cow owners' got the AI service in the service station (clinics) after brought their cows. The management of the animals was classified as poor (extensive), medium (semi intensive) and good (intensive) feeding systems as described by Mureda and Zeleke (2008). Dairy cows were grouped into poor, medium and good body condition based on their corresponding body condition score of 1 to 2 (poor), 3 (medium) and 4 to 5 (good), respectively as indicated by Dawod et al. (2014).

Data management and statistical analysis

The collected data were entered into Microsoft (Ms) excel spread sheet, coded for analysis and imported into statistical package for social science (SPSS) ver. 20 (Chicago, IL, USA). The data were summarized using descriptive statistical analysis such as percentages and tables. Categorical statistically significant association were evaluated using chi square and p-value

RESULTS

Data were collected from a total of 64 dairy cows' owner respondents using questionnaire survey in the Essera woreda. The associations of conceivability and delivery the cow with different parameter like kebeles of the cow comes to AI service, breed, age, body conditions and management practice were also presented in Table 1. All the parameter included in this particular study showed a variation in the conceivability and delivery the cow but, the association is not statistically significant difference (P>0.005) with the exception of management practice of the animal. The management of the animal showed a statistically significant variation (P<0.05), in which the higher conceiver and delivery of cows obtained in good management followed by medium management practice.

To see the status of AI service in different kebele's of Essera woreda, 16 respondents from each kebele that is, Bale, Ofa, Hagele and Guza were taken into consideration. Among a total of 64 respondents in four kebeles, 12 (18.8 %) were receive AI service regularly without interruption. While, majority of respondents could not get AI service regularly (52; 81.25%) due to lack of IA service in the weekend (8; 12.5%), shortage of AITs (16; 25.0%) and shortage of inputs 28; 43.8%). In addition, shortage of AITs and inputs showed a statistically significant difference between different kebele's (P<0.05). But, lack of respondents during the weekend didn't show a significant difference (P>0.005) in four study Kebele's as presented in Table 2.

The major animal health problems associated with AI identified in the study area were conception failure,

Table 1. Different risk factors and their association with conception and delivery of cows in the study area.

Parameter	No. of cows observed	No. of cows conceived	Percentage (%)	P- value	No. of cows delivered	Percentage (%)	P- value
Kebeles							
Bale	18	6	33.3	0.697	5	27.8	0.808
Ofa	20	6	30.3	-	4	20	-
Hagele	18	3	16.7	-	3	16.7	-
Guza	18	5	27.8	-	5	29.8	-
Breed							
Local	69	18	26.1	0.499	16	23.2	0.87
Cross	5	2	40	-	1	20	-
Age of the animal							
$\leq$ 4 years	32	9	28.1	0.668	7	21.9	0.77
5-7 years	30	9	30.3	-	8	26.7	-
$\geq$ 8 years	12	2	16.2	-	2	16.7	-
BCs							
Poor	8	1	12.5	0.619	1	12.5	0.756
Medium	45	13	28.9	-	11	24.4	-
Good	21	6	28.6	-	5	23.8	-
Managements							
Poor	7	0	0	0.000*	0	0	0.00*
Medium	45	5	11.1	-	4	8.9	-
Good	22	15	68.2	-	13	59.2	-

BCs = body conditions, * = statistically significant association.

Table 2. Status of AI service in different kebele's of Essera woreda.

Kebeles	No. of respondents	Receive AI service regularly without interruption (%)	Could not get AI service regularly due to the following reasons		
			Lack of AI service in the weekend (%)	Shortage of AITs (%)	Shortage of inputs
Bale	16	4 (25.0)	2 (12.5)	0 (0.0)	10 (62.5)
Ofa	16	4 (25.0)	1 (6.2)	0 (0.0)	11 (68.8)
Hagele	16	3 (18.8)	2 (12.5)	8 (50.0)	3 (18.8)
Guza	16	1 (6.2)	3 (18.8)	8 (50.0)	4 (25.0)
Total	64	12 (18.8)	8 (12.5)	16 (25.0)	28 (43.8)
χ^2	-	-	1.14	21.33	12.69
p-value	-	-	0.767	0.000*	0.005*

* = Significant association, χ^2 = chi square, % = percentage.

mastitis, and mixed calving and mastitis problem. Among these conception failure was higher in the percentage (25; 39.1%) causing health problems as summarized in Table 3. The satisfaction level of dairy cattle owners was also assessed in this study.

Hence, only 6 (9.4%) of the respondents were satisfied with the overall AI service. But, 58 (90.6%) of the respondents were not satisfied with the overall AI service in Assera woreda. In Bale and Hagele kebeles, equal numbers of respondents were satisfied with AI service (2; 12.5%). Similarly, equal satisfaction was recorded in Ofa and Guza kebeles (1; 6.2%) as illustrated in Table 4.

DISCUSSION

Assessments of the constraints of artificial insemination in Essera woreda of Dawuro zone was conducted in 64 dairy cow owners and AITs with the help of questionnaire survey, and 74 dairy cows record in four selected kebeles of Essera woreda. The research result showed that from 64 dairy cow owners and AITs only, 6 (9.4%) of the respondents were satisfied with overall service. While, 58 (90.6%) respondent were not satisfied with AI service, this findings is in agreement with the report of Baheriw et al. (2013). This higher percentage of non-satisfaction

Table 3. Major animal health problems identified by cow owners in the study area.

Animal health problems	Frequency	Percentage
Conception failure	25	39.10
mastitis	15	23.40
problem of calving	11	17.20
mastitis and calving problem	13	20.30

Table 4. Dairy cow owner's satisfaction assessment in the study area.

Satisfaction level	Kebeles				
	Bale (%)	Ofa (%)	Hagele (%)	Guza (%)	Total (%)
Satisfied	2 (12.5)	1 (6.2)	2 (12.5)	1 (6.2)	6 (9.4)
None satisfied	14 (87.5)	15 (93.8)	14 (87.5)	15 (93.8)	58 (90.6)
Total	**16 (100)**	**16 (100)**	**16(100)**	**16 (100)**	**64 (100)**

% = percentage.

among dairy cow owners might be due to lack of service in the weekend, shortage of AITs and shortage of inputs for the service.

In all study, kebeles of Essera woreda, shortage of AITs and AI service in puts showed statistically significant association (P<0.05), this finding agree with the reports of Baheriw et al. (2013) at west Gojjam, Juneyid et al. (2017) at west Hararghe and Woretaw et al. (2015) at south Gonder which is loacted in different localites of Ethiopia. This might be due to the number of cattle population and lack of well-trained AITs in the Essera woreda. Among the studied kebeles, Guza kebele was the least regular AI service users without interruption which accounts for 6.2% users while, Bale and Ofa kebeles were the maximum regular AI service users (25%), which could be due to their close proximity to the center of the Dawuro zone (Bale town).

The conceivability and delivery of cows in the study area and the association with risk factors like breed of the animal, age, body conditions and management practice were also evaluated using recorded data. The management practice of the cow showed statistically significant association (P<0.05) with conceivability and delivery of cows in which, higher percentage of conceivability (68.2%) and delivery (59.2%) of cows in a good management when compared with lower reproduction in medium management condition and no conceivability and delivery of cows in poor management practice.

This higher conceivability and reproduction in good management might be associated with farmers in good management condition feed their cow with some amounts of concentrate, since complementary feeding with concentrate feed staff is related with good reproduction as reported by Ali et al. (2015) and Tesfaye et al. (2015).

On the other hand, no conceivability and delivery in poor management condition of dairy cows, might be due to extensive management accompanied with insufficient feeding without supplementary, and since insufficient feed and feeds without concentrate feed staff in extensively grazed dairy cows affect their reproductive performance as described by Domecq et al. (1997) and Obese et al. (1999).

The major animal health problem associated with artificial insemination as identified by dairy cow owners were conception failure, mastitis, calving problem (death or dystocia) and mixed problems. The most important constraint associated with AI service was conception failure which accounts for 39.1%. Similar higher frequency and percentage of conception failure problems also reported by Woretaw et al. (2015) and Juneyid et al. (2017) in different districts of Ethiopia. This might be due to lack of will trained and inadequate AITs, not timely inseminated after estrus as depicted by Gizaw and Dima (2016).

CONCLUSION AND RECOMMENDATION

Most of the respondents to questioners' survey were not satisfied with AI service and only small number get regular AI service without interruption. Majority of the respondents didn't get AI service because of lack of service in the weekend, shortage of input and AITs. In the record study of conceivability and delivery of cows, management practice of dairy cow has significant contribution to the reproduction of the animal. In general, AI service in Essera woreda of Dawuro zone was not given great attention and emphasis yet. Therefore, the government and other stalk holder should give training to

the farmers, AITs and supply all necessarily input to the AI service delivery

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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