

Full Length Research Paper

Evaluation of oestrus synchronization and mass artificial insemination service of dairy cattle in Mizan Aman area, Bench Maji zone, South West Ethiopia

Tegegn Fantahun* and Zelalem Admasu

Department of Animal Science, Mizan-Tepi University, P. O. Box 260, Mizan-Teferi, Ethiopia.

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The objectives of this study were to assess the hormonal response, conception rate, calving rate and perception of farmers towards the technology. From 220 cows and heifers brought by farmers for the services, 65% (143) that fulfilled the selection criteria were selected and injected with 2 ml of Cloprostenol. Data on the history of each heifers and cows, number of heifers and cows responsive to hormonal treatment, conception and calving rates were collected. The collected data were analyzed using descriptive statistics. The results of the finding showed that 91(63.64%) of cows and heifers were responsive to hormonal treatment. Majority 81(89.01%) of responding cows and heifers were inseminated. Finally, 11(13.58%) of calves were delivered. Oestrus response rate was relatively high, but conception rates and calving rates were very low. The lower percentages of conception rate which was observed in this study were associated with heat detection problems of farmers, distance from artificial insemination (AI) service centers, timing of insemination and poor husbandry practice of heifers and cows. To improve the effectiveness of the technology, there is a great need of skilled and experienced technician, and capacity building of farmers in heat detection and husbandry practices. Improvements in facilities and management should be necessary before implementing effective estrous synchronization and mass artificial insemination program.

Key words: Cloprostenol, cow/heifer, artificial insemination, oestrus synchronization.

INTRODUCTION

Livestock systems in developing countries are characterized by rapid change (Delgado et al., 1999; Thornton et al., 2007) and currently contributes about 30% of agricultural gross domestic product, with a projected increase to about 40% by 2030 (FAO, 2010).

The Ethiopian cattle population is estimated to be about 53.4 million, of which 55.2% are females. Out of total cattle population, 99.26, 0.64 and 0.1 percent are local, hybrid and exotic breeds, respectively (CSA, 2011). With an average lactation length of 6 months and an average

*Corresponding author. E-mail: tegefanta@yahoo.com.

daily milk production of 1.85 liters per cow, the total milk produced during the year 2010/11 was recorded to be 4.06 billion liters (CSA, 2011). Due to productivity of indigenous cattle, the country is still importing a significant amount of dairy products (Zijlstra et al., 2015).

Cattle breeding are mostly uncontrolled in Ethiopia making genetic improvement difficult (Azage et al., 1995). The total number of exotic and hybrid female cattle produced through the crossbreeding programme for decades in the country is quite insignificant indicating unsuccessful crossbreeding through artificial insemination (AI) (CSA, 2011; Desalegn, 2008; Sinishaw, 2004). Low pregnancy rate following artificial insemination in most African countries is attributed to poor semen quality, poor semen handling procedure, inadequate insemination skill, poor estrus detection and wrong time of insemination (Azage et al., 1995). The use of artificial insemination in Ethiopia is growing but oestrus detection is difficult owing to poorly expressed estrus of Zebu breeds (Mugerwa and Azage, 1991). To improve efficiency of artificial insemination practice in Ethiopia, hormonal synchronization of oestrus have been available for the past few years and have enjoyed success as a tool to make artificial insemination more practical (Azage et al., 2012; Gizaw et al., 2016). However, farmers expressed low satisfaction with the service, although evaluation of the technology by farmers is confounded with low conception rates (Gizaw et al., 2016).

In Ethiopia, attempts to improve the productivity of cattle have been made especially in the area of crossbreeding for the last decades but with little success (Aynalem, 2006). Hormonal oestrus synchronization could be used for increasing the probability of oestrus detection, much calving with feed availability and market demand for dairy products and increase pregnancy rates of dairy cattle (Azage et al., 2012; Lucy et al., 2004). There are different types of protocols available for synchronizing oestrus in cattle (Gizaw et al., 2016). In the study area, single injection of Cloprostenol followed by heat detection and artificial insemination protocol was used. It is important to evaluate the success and failure of the hormonal oestrus synchronization and mass artificial insemination programme so as to provide appropriate solutions in the future. Therefore, this research was conducted having as objectives to identify the hormonal response rate, conception rate and calving rate of cows and heifers and to assess the perception of farmers related with the service.

MATERIALS AND METHODS

Description of the study area

The study was conducted in Mizan Aman area which is situated in Bench Maji Zone south western part of Ethiopia. It is located at 585 km south west of Addis Ababa the capital of Ethiopia. Regarding the agro-Ecology of the zone, out of the total land size 28.042% is lowland, 15.44% midland and 56.74% highland. The annual mean

temperature ranges between 15.1 and 27°C and the annual mean rain fall ranges from 400 to 2000 mm (BMZFED, 2012).

Selection of experimental animals

From the Mizan Aman area, three sites (Addis Ketema, Kometa and Aman) were selected based on proximity to animal handling crush and cattle population. Out of 220 cows and heifers brought to the three sites, only 143(65%) (55 from Addis Ketema, 66 from Kometa and 22 from Aman) were selected. Among selected cows and heifers, 137(95.8%) were Zebu, 4(2.8%) were Sheko and 2(1.4%) were Cross breed. The average body weight of cows/heifer was 208.4 kg (range from 180 to 308). The average age of cows and heifer was 6.36 years range from 4 to 9 years.

The females which were diagnosed to be cycling with presence of a functional CL was determined through rectal palpation by AI technician were injected (2 ml) PGF2 α (Synchromate, Bremer Pharma GMBH, Germany, 1 ml solution of Synchromate contains cloprostenol 0.263 mg equal to cloprostenol 0.250 mg) intramuscular. The protocol used for the experiment was one single injection, heat detection and artificial insemination.

Data collection

The study was conducted from August 2014 to July 2015. Data on age of the cow and heifers, breed, body weight, date and time of hormone treatment, date and time of oestrus detection, date and time of artificial insemination, conception rate (pregnancy diagnosis by rectal palpation) and delivery rate were recorded. Group discussion was also conducted at each site to assess the perception of farmers towards the technology.

Data analysis

The data were entered in Microsoft Excel, checked and analyzed by descriptive statistics using SPSS computer software program (version 17). Oestrus rate (Number of cow showed oestrus/ Number of cows treated multiplied by 100) and conception rate (No. of cows/heifers pregnant / No. of cows/heifers inseminated multiplied by 100) were also calculated.

RESULTS

Hormonal response and insemination rate

The result of the finding showed that 91(63.64%) of cows and heifers were responsive to hormonal treatment. Majority 81(89.01%) of responding cows and heifers were inseminated, 2.19% of cows were aborted due to the drug effect as animal were at early stage of pregnancy and the remaining cows/heifer which did not show heat signs were not inseminated as shown in Table 1.

Conception and calving rate

The conception rate of 24.69% (20) was obtained, after three months pregnancy diagnosis. Finally, the calving rate was 13.58% (11). A total of 8 females and 3 males were delivered finally as presented in Table 1.

Table 1. Oestrus synchronization response, artificial insemination and pregnancy rates of cows and heifers in the study area.

No.	Description	Adis Ketema		Kometa		Aman	
		Freq	%	Freq	%	Freq	%
1	Cows/heifer synchronized		55		66		22
2	Cows/heifer responsive	36	65.45	41	62.12	14	63.63
3	Cows/heifer inseminated	36	100	41	100	4	28.6
4	Calf delivered	4	8.3	6	14.63	1	7.14
5	Cows/heifer sold	2	3.63	5	7.57	0	0
6	Cows/heifer slaughtered	5	9.09	1	1.51	0	0
7	Cows aborted	0	0	1	2.77	0	0
8	Cows/heifer dead	1	33.33	0	0	0	0

Perceptions of the farmers towards the technology

After group discussion with farmers in each site, they had interest to get the services to have improved breed. Cows and heifers were travelled more than 5 km to get the service. In the study area, only few AI technicians were serving large population of cattle and there were no effective regular AI service. Farmers, in the area, were not aware of hormonal oestrus synchronization protocols and AI technology, which contributed in the poor efficiency of the services. Lack of awareness of associated with some farmers during group discussion were immediately mix cows and heifers with other herds after hormonal injection, long distance trucking of cows and heifers, cows and heifers were not brought at the right time for insemination and poor management practices. In general, farmers' perceptions with hormonal oestrus synchronization technology were variable and the satisfaction of them determined by calving rates. Therefore, those farmers that got calf develop positive perception towards the technology and satisfied than others.

DISCUSSION

As compared with the current finding, using single injection of prostaglandin F2 α (Lutalyse) protocol different response rate was reported in different part of the country, higher oestrus responses rate were reported by Azage et al. (2012) who reported 97.7% in Hawassa-Dale milk shade and 100% in Adigrat-Mekelle milk shade areas. Adebabay et al. (2013) reported an oestrus rate of 89.3% in Bahir Dar milkshed; 72.3 and 92.17% oestrus rate reported in West Shoa zone by Bainesagn (2015) and Girmay et al. (2015) in Wukro Kilte Awulaelo district, in Northern Ethiopia, respectively. Moreover, using the same protocol with the current study, 84.2% oestrus rate was reported in eastern zone, of Tigray region, Ethiopia (Tadesse, 2015).

The conception rate obtained in this study was higher than 13.7% reported by Adebabay et al. (2013) in Bahir

Dar milk shed area. In contrast to this finding, in Hawassa-Dale milk shade, 57.7% and in Adigrat-Mekelle milk shade 61.7% of pregnant animal was reported by Azage et al. (2012); 32.17% pregnancy rate was reported in Wukro Kilte Awulaelo district (Girmay et al., 2015); 59.6% conception rate was reported in eastern zone, of Tigray region, Ethiopia (Tadesse, 2015). Factors associated with this lower rate of pregnancy might be related with timing of artificial insemination, feeding management, efficiency of heat detection, early embryonic mortality and presence of ovarian cyst which are all known to negatively affect fertility. Factors affecting embryonic/fetal loss are numerous and include genetic abnormalities, fescue toxicosis, plant toxins, excess protein, heat stress, reproductive diseases, an effect of the sire, and handling or transportation stress (Smith et al., 2011)

Conclusions

As revealed by results of this study, using single injection prostaglandin/Cloprostenol/ was effective to synchronize cows and heifers. Cows and heifers come to heat within short period of time which reduces calving interval. Oestrous response rate was relatively high, but conception rates and delivery rate were very low. To improve effectiveness of the technology, skilled and experienced technicians as well as capacity building of farmers in heat detection and husbandry practices are of major concerns.

Conflicts of Interests

The authors have not declared any conflict of interests.

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