

## Major Constraints of Artificial Insemination in and Around Alamata District, Tigray, Ethiopia

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**Abstract:** A cross-sectional study was conducted from November 2011 to April 2012 in and around Alamata district to assess major constraints that hinder the success of artificial insemination (AI) in cattle population. A questionnaire survey was employed for collecting data from cattle owners and artificial insemination technicians (AIT's) who were purposely selected. A total of 450 cattle owners' and 10 AI technicians were interviewed in this study. The result obtained from cattle owners revealed that the major constraints of AI were lack of awareness about AI (22.2%), time of insemination (21.6%), lack of technician in the area (18%), management problem (8.4%), heat detection problem (8.7%), hygiene problem (8.2%), diseases (8.2%) and unskilled technician (4.7%). AI failure according to different farming systems shows that the highest failure was observed in extensive management system (52%) followed by semi intensive (38.4%) and intensive (9.6%). AI failure was higher in local breeds (53.1%) when compared to cross breeds (46.9%). Whereas, effect of time of insemination on the failure of conception indicates that in mid insemination (29.3%) was low when compared with early (33.1%) and late (37.6%). According to AIT's response for the major constraint for AI success (20%) of each respondent out of 10 think management problem, unskilled technicians and heat detection problems were the major problem in the study area. On the other hand, the most common problem for AITs to deliver AI service were lack of awareness (50%), lack of infrastructure (20%) and lack of AI service in their vicinity (30%). In general, failure of AI due to different constraints affected the production and productivity of dairy farms. Therefore, awareness should be created among animal owner and attendants through training and extension programs about proper management of dairy farms in the study area.

**Key words:** Cattle • Artificial Insemination • Constraints

### INTRODUCTION

Ethiopia owns the largest livestock population but its contribution to the overall production has shown low productivity as compared to their potential. This may be due to their low genetic potential for specific product or enough knowledge is not available on the indigenous breeds [1]. Cross breeding through AI is the most suitable economical and time tested breeding technique for generating the higher genetically potential and productive animals [2]. Artificial insemination, the most commonly used and valuable biotechnology has been in operation in Ethiopia for over 30 years but the efficiency and impact of the operation has not been well-documented [3].

It is widely believed that the AI service in the country has not been successful to improve reproductive performance of dairy industry [4]. From the previous, little

study in AI service is weak and even declining due to inconsistent service in the small holder livestock production system of the Ethiopian highlands [5]. The efficiency of the service in the country, however, has remained at a very low level due to infrastructure, managerial and financial constraints and also due to poor heat detection, improper timing of insemination and embryonic death. The artificial insemination program in rural bovines is greatly influenced by the status of the farmer's i.e. large marginal small and land less farmers [1]. The problem is more aggravated by wrong selection and management of AI bulls along with poor motivation and skills of inseminators [5]. Attempt to improve the efficiency of AI should be based up on the understanding of most important causes for failure. Therefore, the objective of this study was to assess the major problems in the success of artificial insemination at Alamata district.

**MATERIALS AND METHODES**

**Study Area:** The study was conducted in Alamata district. Alamata is the largest district in southern zone administrative of Tigray with an area of 54,228 km<sup>2</sup> and located at latitude of 12.13°, longitude of 39.41° with elevation of 1580 m above sea level. The mean annual rainfall of the town is 727mm with an annual average temperature of 27°c [6].

**Study Design and Study Population:** a cross sectional study was conducted from November 2011 to April 2012 on a total of 450 cattle owners/attendants which are the major users of AI services and 10 AI technicians from Alamata district. Cattle owners and attendants who are familiar with cattle husbandry were selected using purposive sampling techniques based on their willingness to take part in the study. A structured questionnaire was employed for collecting data through direct observation and interviews.

**Data Management and Analysis:** Collected data were entered into Microsoft excel spread sheet and analyzed using SPSS. Descriptive statistics were computed and expressed interms of frequency and percentages.

**RESULTS**

The result obtained from the present study as indicated in Table (1), there are many constraints in the success of artificial insemination in the study area. According to animals owners response the highest challenge of AI in the study area was lack of awareness 100 (22.2%); time of insemination 97 (21.6%); lack of technician 81(18%); management problem 38 (8.4%); heat detection problem 39 (8.7%); hygienic problem 37 (8.2%); diseases 37 (8.2%) and unskilled technicians 21 (4.7%).

AI failure according to different farming system showed that the highest failure was observed in extensive management system 52% followed by semi intensive 38.4% and intensive 9.6% due to different factors (Table, 2).

Out of 450 animals' owners/attendants participated in the questionnaire survey, 239 (53.1%) respondents answered that the higher percentage of AI failure is observed in local breeds. Whereas, 211 (46.9%) of the respondents answered AI failure is common in cross breeds (Table, 3).

Table 1: Major constraints for the failure of AI in Alamata district

Constraints	Frequency	Percent
Management problem	38	8.4
Time of insemination	97	21.6
Heat detection problem	39	8.7
Unhygienic	37	8.2
Lack of technician	81	18
Diseases	37	8.2
Unskilled	21	4.7
Lack of awareness	100	22.2
Total	450	100

Table 2: Major causes of AI failure in different farming systems

Constraints	Farming systems		
	Intensive	Extensive	Semi intensive
Management problem	4(0.9%)	21(4.7%)	13(2.9%)
Time of insemination	10(2.2%)	44(9.8%)	43(9.6%)
Heat detection problem	7(1.8%)	18(4%)	14(3.1%)
Unhygienic	4(0.9%)	19(4.2%)	14(3.1%)
Lack of technician	6(1.3%)	45(10%)	30(6.7%)
Diseases	3(0.7%)	18(4%)	16(3.6%)
Unskilled Technicians	2(0.4%)	13(2.9%)	6(1.3%)
Lack of awareness	7(1.6%)	56(12.4%)	37(8.2%)
Total	43(9.6%)	234(52.0%)	173(38.4%)

Table 3: Failure of conceiving after AI in local and cross breeds

Breed	Frequency	Percentage
Local	239	53.1
Cross	211	46.9
Total	450	100

Table 4: Failure of conceiving due to time of AI service

Time of AI administration	Frequency	Percent (%)
Early	149	33.1
Medium	132	29.3
Late	169	37.6
Total	450	100

The present study also revealed that time of insemination has impact on the success and failure of AI. According to the response of 169 (37.6%) respondents the failure of AI occurs when insemination took place in late period of estrus cycles followed by early 149 (33.1) and medium 132 (29.3%) (Table, 4).

According to AIT's response for the major constraint for AI success 2 (20%) each out of 10 respondents think management problem, unskilled technicians and heat detection problems were the major problem in the study area. Whereas, 3 (30%) and 1 (10%) of the respondents think time of AI and diseases are the major constraints, respectively (Table, 5).

Table 5: Response of technician about the failure AI to conceive

Failure to conceive	Frequency	Percent
Management problem	2	20%
Unskilled technician	2	20%
Heat detection problem	2	20%
Time of AI	3	30%
Diseases	1	10%
Total	10	100%

Table 6: Major problems for delivering AI service

Constraints	Frequency	Percent
lack of awareness	5	50%
Infrastructure	2	20%
lack of AI in vicinity	3	30%
Total	10	100%

The present study also assessed the major problems for delivering AI service by technicians. The result showed that out of the 10 technicians participated in the study 5 (50%) complain that lack awareness among the animal owners is the major problem. Whereas, 2 (20%) and 3 (30%) respondents mentioned infrastructure and lack of AI in vicinity as a major problems, respectively (Table, 6).

### DISCUSSION

This study was conducted to investigate the major constraints of AI at field level with assessing the attitude and perception of animals' owners and AITs in and around Alamata area. About 8.4% of cattle owners revealed that the highest constraint was giving low attention for the overall management practices in the farm. This result is similar with the report of Samson [7] in which failure to conceive of AI can be over come through proper management. Similarly, Azage *et al.* [8] stated that the wide application and success of AI throughout the developed world, the success rate in Africa and other developing countries are still low owing to number of technical, system related financial and managerial problems.

The present study had also showed lack of awareness 22.2 % was the major constraint in the success of AI in the study area. This is due to immoderate linkage between the AI service center about the education and training by AITs and other responsible bodies [8]. Again, the outcome of the study revealed that there is no appropriate communications among stakeholders in which the AI center failed to do which consequently contributed to the unsuccessfulness of the service distribution. These constraints lead them to keep endogenous cattle with low productivity and productions.

Failure of AI service due to diverse problems with regard to different farming system showed that 52.0% extensive, followed by 38.4% semi intensive and 9.6% intensive farming system. This is because extensive management system is not easy for the owner to detect all changes occurred in animals. Whereas, intensive management system encourage the owners to practice proper follow up of heat detection and timely insemination as well as they have awareness about AI. These finding is in-line with the finding of Daris [9], estrus detection is the most important limiting factor for optimum reproductive performance. In sufficient or inaccurate estrus detection leads to reduced conception rate and thus extended calving intervals.

The questionnaire survey of this study was assessed the constraints of AI between breeds. Most of AI constraints were encountered in local breed (53.1%) because of most of the owner manage their animals in extensive system were close supervision of the animals were only at night when they return to backyard. This agree with report of Negassi [10] in which AI were efficiently used in cross breed than local breed.

As indicated by 37.6% of respondents' heat detection problem was the main reason for the failure of AI. These finding is in-line with the finding of Zerhiun [11], the maximum number of non-pregnant animal, 74 (72.54%) were found in the failure of estrus detection from the total non-pregnant cow and heifers inseminated. On time heat detection is requiring succeeding or failure of AI depends on how well these tasks are performed. Animal should be inseminated within 24 hours of heat because late and early insemination may affect the conception rates of both heifers and cows [4].

According to 30% of AIT's explanations, the main constraint of AI was lack of AI service at the animal owners' vicinities. This also led them to lose the chance to inseminate their animals for further profit. This also agreed with report of FAO [12] that systems related problems are small herds, disperse locations, limited production intensity and affordable cost and due to poor financial capability of countries, means of communication and infrastructure are insufficient.

From the response of 20% of AIT's unskilled technicians are the reasons for the failure of AI. The experience of AIT's was the most important factor for the success of AI. This indicates a need for capacity building of technicians through regular training. The finding of this study is in agreement with the suggestion of [11, 14].

## CONCLUSION

There were many constraints that hinder the success of AI program in study area. The most important ones are management problem, time of insemination, hygiene problem; heat detection problem, lack of technician, diseases, unskilled technician and lack of awareness about AI. These constraints finally resulted with poor production system, inadequate financial profit and keeping animals without conceiving for many months or years with addition cost for these animals. Hence, awareness should be created among animal owner and attendants through training and extension programs. Whereas, private sectors should be encouraged to be involve in the AI service sector.

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