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The Occurrence of Reproductive Problems of Bulls in Hawassa Artificial Insemination Center, Sidama, Ethiopia

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Abstract

A longitudinal study was undertaken to investigate the occurrence of reproductive problems of bulls in Hawassa Artificial Insemination Center, Sidama, Ethiopia. Disease history record of the breeding bulls in the center was analyzed to estimate the incidence rate of venereal diseases of bulls on the quality and quantity of bovine semen. The study animals were Holstein-Friesian, Jersey and Boran breeds of bulls. A four years' (November, 2016 to June, 2021) health record of the breeding bulls was analyzed to investigate and estimate the venereal diseases. All the bulls were managed intensively in the center. The purebred bulls of Holstein-Friesian, Jersey and Boran breeds (n = 20) supposed to produce semen were maintained under artificially ventilated open-sided sheds. The health records of each bull were assessed from the case book of the center's veterinary clinic. Lameness, arthritis, preputial warts and Lumpy Skin Disease (LSD) were some of the diseases diagnosed in the bulls. Some of these diseases might have caused the occurrence of defective and dead sperm cells which affected the quality as well as the quantity of the semen produced in the center. Serum sample was collected at different times from all the bulls and the sample was sent to the National Animal Health and Disease Investigation Center (NAHDIC), Addis Ababa. The sample was tested using Indirect-Enzyme linked Immuno-sorbent Assay (ELISA) and Rose Bengal Plate Test (RBPT) to detect the presence of viral and bacterial diseases which were supposed to be venereal in type. Of the total 20 bulls 10 (50%) of them were affected by different types of diseases. Three (15%) of the bulls were found positive for Infectious Bovine Rhinotrachietis (IBR) while two (10%) of them were found to be positive reactors for Bovine Virus Diarrhea (BVD). Hence, the overall cumulative incidence rate of viral venereal diseases was found to be 0.11 per animal-year at risk. The results of this study indicated that IBR was the most important type of venereal disease followed by BVD which significantly ($p<0.05$) affected the quality and quantity of bovine semen. These diseases are highly infectious and contagious viral diseases, and need a special bull disease management measures. Moreover, those bulls which are tested positive for the above mentioned diseases should be culled as soon as possible to curtail further transmission of the diseases to the healthy bulls. As the diseases are encountered when there is lack of strict screening test and quarantine management, strict bull health management and biosecurity issues should be focused on. Hence, veterinarians in charge and bull attendants, too, should pay due attention on the biosecurity and quarantine measures in the center.

Keywords: Bulls, Bulls, Diseases, Ethiopia, Hawassa, Holstein-Friesian, Venereal Diseases, Reproductive Problems

1. Introduction

The number of crossbred and hybrid cattle breeds in Sidama National Regional State is estimated to be only 0.3% (42,322) of the total cattle population of the country [1]. Among the major constraints for the low number of crossbred and hybrid cattle breed in the region is mainly due to low level of crossbreeding activities. To solve such a problem, local cattle breed improvement endeavors through crossbreeding in the region has been in place for decades. One of such endeavors includes grading up of indigenous cattle breed through AI service [2, 3, 4]. For more than half a century, conception and calving rates of cattle has been enhanced by AI services. Some of the factors affecting quantity and quality of semen are reproductive problems of bulls and venereal diseases [4, 5, 6, 7].

Venereal diseases are those diseases that can be spread through natural and AI services. Venereal diseases in the bulls can cause failure of cows to conceive and loss of pregnancies through abortion or re-sorption. These diseases are usually transmitted by an infected bull mating with susceptible cows or during insemination of infected semen [8].

However, an uninfected bull can spread the disease by mating with an infected cow and subsequently breeding a susceptible cow within a short period of time. More unusual cases can occur by the use of infected semen from custom collection of bulls and the failure to test the bull and/or semen for venereal diseases. Use of the same glove to perform vaginal examinations can spread venereal diseases as well [9].

Venereal disease in cattle can be caused by bacteria, viruses, and protozoal organisms. *Campylobacter fetus* (Vibrio), *Trichomonas fetus*, Bovine Herpes Virus (a form of IBR), *Hemophilus somnus*, ureaplasma, mycoplasma, and Bovine [9]. Bovine Viral Diarrhea (BVD) is the most commonly recognized causes of venereal disease in cattle. Vibriosis and Trich are only spread by venereal contact. The viruses and bacteria can be spread through other contact with infected animals such as through aerosol spread through the respiratory tract [10].

Bovine Herpes Virus and BVD are viruses that can be shed to the cow through breeding although spread through aerosols spread via the respiratory tract is more common. This normally occurs during active infection of the bull. While bulls with active herpes virus infections will have lesions or other signs of disease, those with BVD do not. The biggest concern with these viruses is a bull that is persistently infected with BVD and therefore shedding the virus in every ejaculate as well as every other bodily secretion [11].

Venereal diseases are only spread by the mating of an infected animal to a non-infected animal. Therefore, the absence of infected animals will prevent venereal disease from affecting the herd. Maintaining a closed herd is perhaps more challenging than we realize. The introduction of herd bulls is most likely to introduce venereal diseases into a herd. Ideally, only virgin bulls should be brought into the herd. All new bulls, including “virgin” bulls, should be tested for venereal diseases and the testing should be complete as a single test will miss most infected animals [8]. Prevention of venereal diseases, like all diseases, is largely dependent upon the management of the herd. It requires use of a number of practices in a program where a lapse in one aspect will limit the effectiveness of the other components [10].

An important aspect of the control of venereal diseases is vaccination. A vaccination program should be in place for all herds that is comprehensive for all diseases that exist within the herd or that may become a problem. Effective vaccines are available for BVD, IBR, Vibrio, and Trichomoniasis. In order to get the optimum use of these vaccines, the timing of their administration is critical [12]. Vibrio and trichomoniasis vaccines are most effective when used immediately prior to the breeding season. While this may be less than ideal for some management schemes, the return to the cattleman

in terms of the number of calves and the increase in weaning weights from early calving more than make up for any additional handling [8, 9].

Hence, proper investigation of reproductive problems in general and venereal diseases in particular of breeding bulls is a crucial step in the improvement of the quality as well as the quantity of bovine semen. Therefore, the present study was undertaken to identify the level of reproductive problems and the occurrence of venereal diseases to estimate the incidence rates as well as to estimate their impacts on the quantity and quality of semen produced by the Holstein Friesian and Jersey breeds of bulls maintained under climatic conditions of Hawassa, Sidama.

2. General and Specific Objectives

The general objective of this study was to estimate the incidence rate of venereal diseases in Holstein-Friesian and Jersey breeds of bulls. The specific objectives include:

- To identify the reproductive problems of Holstein-Friesian and Jersey breeds of bulls,
- To estimate the cumulative incidences and incidence rates of venereal diseases in Holstein-Friesian and Jersey breeds of bulls,
- To estimate the effect of venereal diseases on the quantity and quality of bovine semen,

3. Problem Statement

Cross breeding, especially grading up of local cattle breeds, has been practiced for at least half a century in Ethiopia. This was done as a natural mating and Artificial Insemination (AI) techniques. The use of Artificial Insemination technique has been running under different kinds of challenges which have been affecting its efficiency and effectiveness. Some of the problems associated with natural mating and AI services include reproductive problems of bulls, different kinds of venereal diseases which resulted in poor quality of bovine semen. The above mentioned problems resulted in poor conception and calving rates, too [13]. Although there are several studies of reproductive problems in cows, studies specific to reproductive problems in bulls is rare in Ethiopia unlike in overseas [14, 15]. This indicates that reproductive health of bulls is overlooked as reproduction is an only function of cows.

Delivery and supply of adequate and quality semen has been a forerunning challenge faced so far in the crossbreeding activity. This has seriously affected the grading up breeding system and the reproductive efficiency of the crossbred cattle. Adequate and quality bovine semen supply is expected to happen from healthy semen. This, in turn, improves the conception rate and the effectiveness of the local cattle grading up endeavors and reproductive efficiency. Supply of healthy quality semen enhances the calving rate of cows. Among the several cause, unhealthy and poor quality of bovine semen can be attributed for repeat breeding and infertility of cows [16]. Hence, the bull selection, the production and processing of bovine semen has to be given great attention. This ranges from selecting appropriate sires to proper health management of bulls for the production of quality semen. In this regard, critical pre-clinical examination of breeding bulls, evaluation and processing of semen is crucial tasks for the production of healthy and the quality semen [13, 17].

4. Materials and Methods

4.1. The Study Area

This study was undertaken in the capital city of Sidama National Regional State, Hawasa. The city is located at a distance of 275 km south of Addis Ababa. It has got its name from Lake Hawassa which is located at western part of the city. The total human population of the city is estimated to be 450,000 and the surface area of the city is estimated to be 157.2 square killo meters. Administratively, the city is subdivided into 6 sub-cities and 24 kebeles. According to the World Meteorology Agency (WMA**),** it is found at a coordinates of 7.3 N Latitude and 38.28 E longitudes, respectively. Agro-ecologically, the city is situated at an elevation range of 1,500 meter to 1,750 meters above sea level.

The average rainfall is 1091 mm whereas the average rainy days are 160. The record high temperature in degree Celsius is 33 with the average high being 27.3 and the average low being 12.6 degree Celsius. The record low temperature was taken to be minus 2 in degree Celsius [18].

Urban agriculture especially livestock production is known in the study area for the purpose of food and income generation. Rearing of cattle, shoats, equines and poultry and beekeeping are practiced in the city. The livestock production system is intensive and urban dairy production type. Milk and butter are the common livestock products consumed by the people of the city.

HAIC-Hawassa is established in 2015 by the then regional agricultural bureau (BoA) with the help of Agricultural Growth Program (AGP). The total surface area of the center is 22,100 meter square. The center started semen production activity on November, 2016. Including the semen processing laboratory, the center has got different kinds of infrastructures [18]

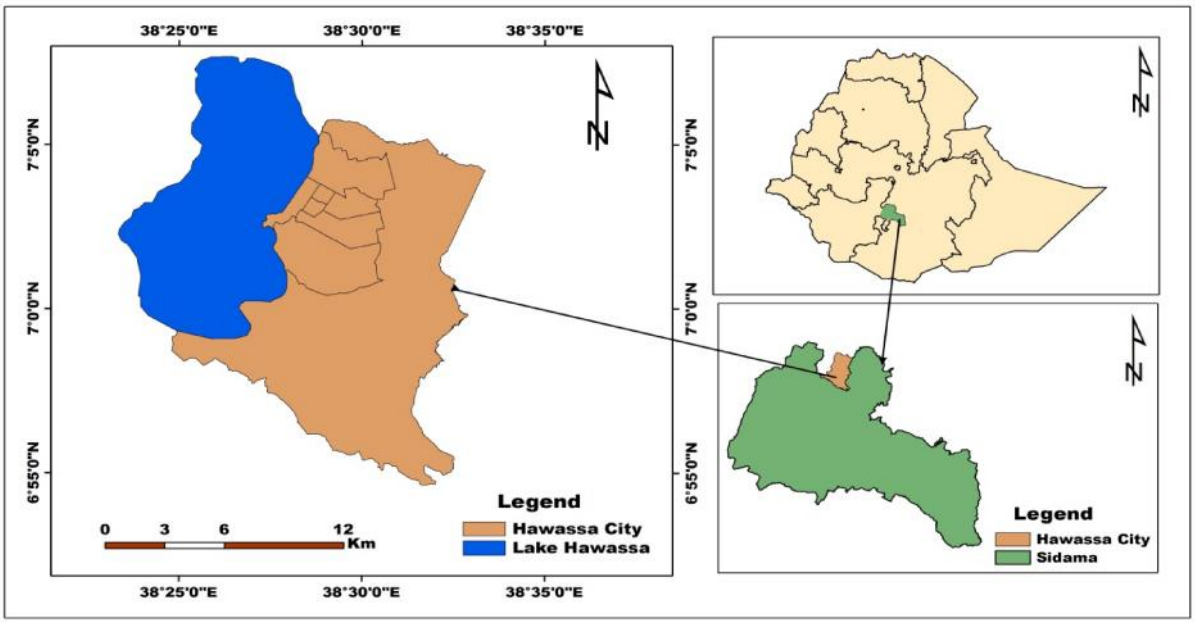

Fig 1: Topographic map of the study area [19]

4.2. Study Design

A longitudinal study was undertaken to investigate the occurrence of reproductive problems of bulls in Hawassa Artificial Insemination Center, Sidama, Ethiopia. All the bulls i.e., Eight (8) Holstein-Friesian, 10 Jersey and two (2) Boran breeds of bulls were included in the study. Health history record data of the breeding bulls was analyzed to estimate the reproductive problems of the bulls in the center. The general health conditions and other problems were analyzed from the health records of the case book of the center's veterinary clinic. A four years' (November, 2016 to June, 2021) health record of the breeding bulls was analyzed to investigate and estimate the occurrence of venereal diseases. A special emphasis was given to the occurrence of infectious diseases in the bulls. The cumulative incidence rates and incidence rates of venereal diseases of bulls were assessed to estimate its effect on the quality and quantity of bovine semen.

4.3. Study Bulls

There were Eight (8) Holstein-Friesian, 10 Jersey and two (2) Boran breeds of bulls with different exotic blood composition level. Their age ranged from 19 months to 66 months. They were selected and brought to the center through a series of breeding and health check for meeting selection criteria of breeding bulls for AI purpose. Three of the Holstein-Friesian bulls were bought and brought from the Netherlands. Three of the Jersey bulls were bought and brought from South Africa whereas two Boran bulls were bought and brought from Jidgo Tiyora Boran cattle ranch, Borana Zone, Yabello, Oromia regional state. The rest 12 Jersey breeds of bulls were bought and brought from Wolayita Sodo Jersey cattle breeding center.

All the bulls were fed with commercially made concentrate, with hay and green feed according to their body weight and semen production status [20, 21]. The bulls were kept in a concrete made standard bull house with separate pens. Their health condition was followed and checked regularly with a veterinarian. Their general and specific health information was recorded in a standard case book of the center. All the bulls were screened biyearly for the presence or absence of venereal diseases.

4.4. Study Procedures

4.4.1. Bull Health Management and Recording System

All the bulls in the center were tested and screened for the major reproductive health problems in the process of sire selection. Before the bulls were introduced in to the center, they were tested for the presence or absence of infectious venereal diseases such as Brucellosis, Bovine tuberculosis (BTB), Trichomoniasis, Infectious Bovine Rhenotrachiatis (IBR) and Bovine Viral Diarrhea (BVD). After fulfilling the disease screening criteria, the bulls are allowed to enter the center for semen production. Besides, the selected bulls were quarantined in the center for at least two months. Then after, they were intermingled with the already present bulls. The bulls were fed and housed according to bull management standards.

Periodic health checks were made on the bulls by the center's veterinarian. Whenever the bulls were sick, general physical clinical examination was made and based on the clinical signs the disease problem was diagnosed and appropriate treatment was made on the sick bulls. All the health information was noted in the center's bull health standard case book. Moreover, disease prophylactic and control measures were taken. Major vaccines such as anthrax, LSD, FMD, black quarter and others were given according to vaccination calendar. Though not strict, additional biosecurity measures were taken. Biyearly screening test for the venereal diseases of the bulls was undertaken by National Animal Health Diagnostic and Investigation Center (NAHDEC) by taking proper samples. These venereal diseases were brucellosis, Bovine Tuberculosis (BTB), Trichomoniasis, Infectious Bovine Rhenotrachietis (IBR) and Bovine Viral Diarrhea (BVD).

4.4.2. Materials Needed

Different kinds of Laboratory equipment and chemicals were needed for the serological tests. The major one of them includes:

Ice box and ice pack,
Disinfectant (75% alcohol) and savlon
Gauze, cotton, gloves
Venoject needle (vacutainer)
Kits for ELISA, RBPT, CIDT tests

4.4.3. Blood Collection and Serological Test Procedures

Biannual disease screening test was done on all the bulls in the center. A total 35 blood samples from 20 bulls were collected in six terms from jugular veins of each bull. The blood samples were sent to National Animal Health and Diseases Investigation Center (NAHDIC). Indirect ELISA serological test was done to diagnose IBR & BVD whereas RBPT was done to test bovine

brucellosis. Moreover, comparative intradermal tuberculin (CIDT) test was done to diagnose BTB.

4.4.3.1. Enzyme-Linked Immune-sorbent Assay (ELISA) Test

ELISA stands for enzyme-linked immune-sorbent assay. It is a commonly used laboratory test to detect antibodies in the blood (serum) samples. An antibody is a protein produced by the body's immune system when it detects harmful substances, called antigens [22, 23].

Indirect ELISA is a two-step ELISA which involves two binding process of primary antibody and labeled secondary antibody. The primary antibody is incubated with the antigen followed by the incubation with the secondary antibody. However, this may lead to nonspecific signals because of cross-reaction that the secondary antibody may bring about [23, 24]. The following steps were done for ELISA:

- Micro-well plates were incubated with antigens, washed up and blocked with BSA.
- Samples with antibodies were added and washed.
- Enzyme linked secondary antibody were added and washed.
- A substrate was added, and enzymes on the antibody elicited a chromogenic or fluorescent signal.
- The result was recorded and interpreted,

4.4.3.2. Rose Bengal Plate Test (RBPT)

Rose Bengal test is often used as a screening test in human brucellosis and would be optimal for small laboratories with limited means. False-negative reactions occur especially in the early stages of acute infection.

Rose Bengal Plate Test (RBPT) is a rapid test that was originally designed to screen animal populations but is also used as an adjunctive test for rapid diagnosis of brucellosis in humans. It is a simple, rapid slide-type agglutination assay performed with a stained *B. abortus* suspension at pH of 3.6–3.7 and plain serum. Positive results were generally confirmed by the standard agglutination test (SAT). Although the overall sensitivity reported for RBPT varied widely, with the use of good quality antigens made by experienced or reference laboratories, the sensitivity of RBT could be increased. The following steps were done for RBPT:

- Test Serum (0.03 ml) is mixed with an equal volume of antigen on a white tile or enamel plate to produce a zone approximately 2 cm in diameter.
- The mixture is agitated gently for four minutes at ambient temperature, and then observed for agglutination.
- Any visible reaction is considered to be positive.

Besides, the standard comparative intradermal tuberculin (CIDT) test procedure for bovine was conducted as it was indicated by [25]. The final results of the three tests were submitted from NAHDEC to the center with an official letter.

4.5. Data Entry and Analysis

The data was double entered in Microsoft excel (Microsoft Corp. Redmond, USA, 2016) and it was validated before it was being imported into SPSS version 21. Explanatory variables were cross-tabulated using Pearson’s chi-square test or Fisher’s exact test if cells with less than five of expected frequencies occur. The following explanatory variables were added in the analysis: breed of bulls, age of bulls and origin/source of bulls. Sire health disease history, the occurrence of each disease from case book, screening test results, general and specific prevalence, cumulative incidence and incidence rates were analyzed from the disease history of the bulls in the center. The raw data collected was condensed and summarized with the help of tables and graphs. Moreover, summary statistical quantities such as means, standard errors and measure of dispersion such as variance were included. Then the population parameter was estimated and

inferred from the sample statistical quantities. The study result was analyzed using general linear model (GLM).

5. Results and Discussion

Proper investigation of breeding bulls for reproductive health problems before they begin producing semen and during they are producing semen is practically important in artificial insemination services. Assuring the health status of breeding bulls before and during semen production enhances in achieving optimum reproductive efficiency such as conception and calving rates of cows. Therefore, a longitudinal study was undertaken to investigate the occurrence of reproductive problems of bulls in Hawassa Artificial Insemination Center, Sidama, Ethiopia. A four years' (November, 2016 to June, 2021) health record of the breeding bulls was analyzed to investigate and estimate the occurrence of reproductive problems and venereal diseases. The study was conducted on 20 breeding bulls (8 Holstein-Friesian, 10 Jersey and 2 Boran) to estimate the occurrence of reproductive problems of bulls and the incidence rates of venereal diseases. Disease history record of the breeding bulls in the center was analyzed to estimate the incidence rate of venereal diseases of bulls which affect the quality and quantity of bovine semen. IBR, BVD, Lameness, chronic arthritis, preputial warts and Lumpy Skin Disease (LSD) were the major reproductive diseases diagnosed in the bulls. Some of these diseases might have caused the occurrence of defective and dead sperm cells which affected the quality as well as the quantity of the semen produced from the bulls.

Table 1: The major reproductive problems of bulls with respect to breed and age in the center

Reproductive problems	Breed			Origin	Age	Total period (life time) prevalence (%)
	H-F*	Jersey	Total			
IBR	1	2	3	S/Africa**	Adult	15.0
BVD	1		2	Kality	Adult	10.0
Lameness	1		2	Holand	Adult	10.0
Chronic Arthritis	1		1	Holand	Adult	5.0
LSD	1		1	Holand	Adult	5.0
Preputial Wart	1		1	Holand	Adult	5.0
Death rate	4	1	5	Holand & S/A	Adult	25.0
Lack of libido		1	1	Sodo	Adult	5.0
Oligospermia		1	1	Sodo	Adult	5.0
Infertility	1		2	Sodo	Adult	10.0
Culling rate	2	2	4	Sodo	Adult	15.0

* = Holstein-Friesian
** = South Africa

Under general physical clinical examination, the average age of the bulls was 43 months while the maximum age of them were was 60 months for Jersey bulls and the minimum age was 23 months for Jersey breeds of bull. In this study, there was no significant relationship between age of the bulls and occurrence of reproductive diseases of bulls in the center. However, though not significant, there was a relationship between the breeds of bulls and the occurrence of reproductive diseases in the bulls in that H-F bulls were more affected by reproductive problems than the Jersey and Boran breeds of bulls.

Those bulls bought and brought from Holland and South Africa were found to be more affected by reproductive problems than bulls which were bought and brought from Wolayita Sodo and Boran. This might be attributed to the fact that the Jersey and H-F breeds of bulls might not have adapted the tropical climate.

Of the total 20 bulls investigated longitudinally, (50%) of them were affected by different types of reproductive problems (Table 1). This indicates the morbidity rate of bulls in the center was relatively high. Besides, the culling rate of bulls due to reproductive problems in the center was found to be 20%. IBR & BVD were the major causes of culling in the center. Three (15%) of the bulls were found positive for Infectious Bovine Rhenotrachietis (IBR) while two (10%) of them were found to be positive reactors for Bovine Viral Diarrhea (BVD) (Table 1 & 2).

Jersey breeds of bulls were more affected by IBR (10%) whereas Holstein-Friesian breeds of bulls were more affected by BVD (10% Table 1). The overall incidence rate of venereal diseases in the bulls was found to be 5 per 44 animal-years at risk (11 per 100 animal-years at risk) (Table 2). This is incidence rate is relatively higher than expected. The results of this study indicated that IBR was the most important type of venereal disease followed by BVD. Bulls have been shown to excrete BVD and IBR viruses in their semen following spontaneous, persistent and chronic infection [26].

Table 2: Incidence (I) rate IBR) & BVD

Bull ID	Period of Observation	Breed	Disease Diagnosed	Time of development of IBR & BVD after beginning of observation	Contribution to animal-years at risk
172	3 years	Jersey	IBR	3 years	3 years
228	3 years	Jersey	IBR	3 years	3 years
1515	3 years	Jersey	IBR	3 years	3 years
8240	3 years	H-F	Negative	No disease	3 years
9660	3 years	H-F	Negative	No disease	3 years
4872	3 years	H-F	Negative	No disease	3 years
2697	2 years	H-F	BVD	2 years	2 years
4661	2 years	H-F	BVD	2 years	2 years
4679	2 years	H-F	Negative	No disease	2 years
4690	2 years	H-F	Negative	No disease	2 years
4698	2 years	H-F	Negative	No disease	2 years
4905	3 years	Jersey	Negative	No disease	3 years
4906	3 years	Jersey	Negative	No disease	3 years
4904	3 years	Jersey	Negative	No disease	3 years
4908	3 years	Jersey	Negative	No disease	3 years
4909	3 years	Jersey	Negative	No disease	3 years
4901	1 year	Jersey	Negative	No disease	1 year
4902	1 year	Jersey	Negative	No disease	1 year
344	1 year	Boran	Negative	No disease	1 year
1727	1 year	Boran	Negative	No disease	1 year
Total					**44 years**

IBR & BVD are highly infectious and contagious viral diseases, and need a special bull disease management measures. Moreover, those bulls which are tested positive for the above mentioned diseases should be culled as soon as possible to curtail further transmission of the diseases to the healthy bulls. As the diseases are encountered when there is lack of strict screening test and quarantine management, strict bull health management and biosecurity issues should be focused on. Hence, veterinarians in charge and bull attendants, too, should pay due attention on the biosecurity and quarantine measures in the center.

The crude mortality rate, referring to deaths of bulls from all causes of disease of the center, was analyzed in the bulls. The death rate (the total mortality rate) for all reproductive diseases of the bulls was found to be 25%. The major diseases which caused the death of the bulls in the center are lameness (10%) & chronic arthritis (5%). Although they are the father of all cattle, less attention is given to bulls in relation to the reproductive problems. Rather, more attention is given to the reproductive problems of cows and further studies are done on them. That is why there are very few (if not none) studies undretaken in reproductive problem of bulls. It was indicated that the exposure status of cows for brucellosis was 4.8% in dairy herds of Ethiopia cattle population [14].

The core finding of this study indicated that there is a reproductive problem in bulls. The reproductive problems have caused the culling and death of bulls. This in turn has resulted in infertility of bulls and reduction in the quantity and quality of semen production. Therefore, it can be summarized that reproductive problems in bulls, especially viral venereal diseases are most prevalent and affecting the health of breeding bulls meant for AI services. Proper health management and biosecurity issues should be given a great emphasis. As semen quantity and quality is markedly influenced by reproductive problems of bulls, so strict measures in the first stage selection and in administration stages of new breeding bulls to the center is a crucial issue.

6. Conclusion

The health records of each bull in the center were investigated from the case book of the center's veterinary clinic. IBR, BVF, lameness, arthritis, perpetual warts, Lumpy Skin Disease (LSD) were the major diseases problems diagnosed in the bulls. Some of these diseases might have caused the occurrence of defective and dead sperm cells which affect the quality as well as the quantity of the semen produced in the center. This study indicated that the incidence rate of viral venereal disease in the study bulls was found to be relatively higher (25%). The results of this study indicated that IBR was the most important type of venereal disease followed by BVD which significantly ($p<0.05$) affected the quality and quantity of bovine semen. These diseases are highly infectious and contagious viral diseases which need a special disease management and biosecurity measures. Those bulls which are tested positive for the above mentioned disease should be culled as soon as possible to curtail further transmission of the diseases to the healthy bulls. As this type of diseases are encountered when there is lack of strict screening test and quarantine management, there should be strict bull management system and biosecurity measures Hence, veterinarians in charge and bull attendants, too, should focus on the biosecurity and quarantine issues.

In general, venereal diseases in cattle cost the cattle industry hundreds of billions of dollars annually in the world. This is also true in our context. Yet, the use of effective control measures including bull health management and vaccination offer cattlemen reliable, cost effective controls. In order to maximize the dairy products and to get the optimum profitability out of the dairy industry, cattlemen must work with their animal health experts to design programs tailored to their management since the returns are most certainly worth the efforts.

7. Recommendations

Based on the above conclusion, the following points are recommended:

1. Proper housing, sufficient feeding and adequate watering are paramount management practice to reduce the occurrence of reproductive problems of bulls. For this matter, the bull houses should be well ventilated, the floors corrugated and hygienically maintained.

2. Path ways, walking areas and recreation sites of bulls have to be constructed appropriately as defects in these facilities lead injuries of the foot and there by predisposes the bulls to lameness.

3. Regular screening test of bulls for all venereal diseases and early culling of positive bulls is highly needed as further maintaining of positive bulls is risky for healthy bulls.

4. Bulls should be walked around every day as this kind of practice avoids excessive growth of hooves and nails of bulls thereby preventing the bulls from leg and hoof injuries.

5. Strict biosecurity measures have to be applied. These include foot and vehicle bathing schemes as well as protective clothes. Other than the center's workers, any intruder have to respect the biosecurity rules drawn to protect the bulls from transmissible diseases.

6. Proper sire selection and screening test of bulls for venereal diseases before introduction of them to the center should be done as some of the venereal diseases could have been transmitted and passed from the farms where the bulls were grown to the AI center.

7. Furthermore, broader, detail and in depth study on reproductive problems in general and on the venereal diseases in particular of both in naturally mating and bulls meant for AI services should be undertaken. This should be done both in intensive and extensive livestock production systems of different areas.

8. Bull health record keeping system should be enhanced in the center's veterinary clinic as it is an essential resource to trace back the general and specific health history of bulls in the center.

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9. References

1. CSA (Central Statistics Agency), 2015. *Central Statistics Agency, Agricultural Sample Survey, volume II, Report on livestock and livestock characteristics. Statistical Bulletin 388. pp: 9-10, 25-27* (Vol. 338). Addis Ababa: Federal DemocraticRepublic of Ethiopia.
2. Bekele, T., 2005. Calf Sex Ratios in Artificially Inseminated and Naturally Mated Female, pp: 225-230. *conference of the Ethiopian Society of AnimalProduction.* Addis Ababa, Ethiopia.
3. Zewde, E., 2007. Artificial insemination and its implementation. *7*(14).
4. Albie, T. R., 2015. *Assessment ofproblems associated with artificial insemination service in Gondar Town, Northern Gondar* . Gondar: Facultyof veterinary Medicine, Gondar.

5. Arthur, G. N., 1982. Reproduction and Veterinary Obstetrics, 5th edn. *Baillière Tindall*.
6. Dessalegn, G., 2008. *Assessment of problemsassociated with artificial insemination service in Ethiopia. Thesis of MSc DebreZeit.* Debre Zeit: Addis Ababa University,Faculty of veterinary Medicine.
7. H, A., 2006. Evaluation of artificial insemination service efficiency and reproductive performance in North Gondar Zone, Ethiopia,MSc. Thesis. Alemaya University, . Alemaya.
8. Overbay, T. D., 1999. *Venereal Diseases in the Bull.* Fort Do dge, 43 Green Tree Circle: Bristol, VA 24201.
9. BonDurant, R., 1997. *Pathogenesis, Diagnosis, and Management of Trichomoniasis in Cattle, Veterinary Clinics* . North America Food Animal Practice .
10. Vasquez, L. e., 1983. Bovine Genital Campylobacteriosis (Vibriosis): Vaccination of experimentally infected bulls,. *American Journal of Veterinary Research.*, 1553-1557,.
11. Lichtenwalter, R., 2000. Eastern North Carolina Extension Beef Specialist,Personal Communication.
12. Panangala, V. A., 1981. American Journal of Veterinary Research, . *42*.
13. Pearson., 2008. *Arthur's Veterinary Reproduction and Obstertrics, Eith edition,*. Birtish Library.
14. Asmare, K., 2014. Neospora caninum versus Brucella spp. exposure among dairy cattle in Ethiopia: A case control study. *ELSEVIER, Tropical Animal Health and production, 46*(6).
15. Yoo, H., 2010. Infectious cause of reproductive disorders in cattle. . *56*.
16. Technoserve., 2016. Developing a Market Led Strategy for the Ethiopian Dairy Industry,. Nirobi.
17. Ahmed JU, S. M., 1993. Breeding soundness of the bull used for artificial insemination in Bangladesh n Bangladesh. . Bang J. Agric. Sci.
18. CSA (Central Statistics Agency), 2006. Federal Democratic Republic of Ethiopia, 2006. Agricultural Sample Survey 2006/07, *volume II, Report on livestock and livestock characteristics*. Statistical Bulletin 388. Addis Ababa, Ethiopia. p. 9-10, 25- 27.
19. Bureou of finance and economic development (BoFED), 2014. Bureou of finance and economic development, SNNPRS, Statistical abstract. Hawassa: BoEFED.
20. Garner, D.L., 1991. Artificial Insemination. In: Cupps, P.T. (ed.), *Reproduction in Domestic Animals*. 4th ed. San Diego, California: Academic Press. P. 251-274.
21. Pagot, 1992., Animal production in the tropics and subtropics. Macmillan Press Ltd. London and Basingstocke.
22. Engvall, E., 1972. Quantitation of specific antibodies by enzyme-labeled anti-immunoglobulin in antigen-coated tubes. J Immunol. 1972 Jul;109(1): 129-35. PMID: 4113792
23. Ishikawa, E., T. Kohno, 1989. Development and application of sensetive enzyme immunoassay for antibodies: A review. J. Clin Lab Anal. 3(4): 252-65. PMID: 2668479
24. ROBERT, H., 2016. *ELISA (SOFTCOVER reprint OF ed.).* Place of publication not identified.

25. Mantoux, C.,2015. *www://https://en.wikipedia.org/wiki/Mantoux_test,The Mantoux test or Mendel-Mantoux test (also known as the Mantoux screening test, tuberculin sensitivity test, Pirquet test, or PPD test for purified protein derivate)/accessed on 18 October 201*.
26. Barlow, R. H., 1986. Vet. Rec. *118*(321).

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