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Causes of Abortion and Prevalence of Brucellosis in Small Ruminant in Ethiopia

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Abstract

The study was conducted in Tigray region, kola Tembien wereda, Begashika watershed area in 2010. The main objective of the study was to identify the cause of abortion in small ruminant and to determine the prevalence of brucellosis. Questioner survey and rose Bengal agglutination test of blood sample of sheep and goats were used for data collection. Result from the questionnaire survey revealed that, from 82 respondents 68 (82.9%) of them were complain abortion and 62 (75.6%) of them doesn't consider abortion as a disease. From 471 sheep and goat found in the watershed 214 (45.4%) them were aborted during the study year. Late pregnant abortion was 51 (62.2%) and 65 (79.3%) abortion occur in young sheep and goat. From the suspected abortion causes, toxic plant and brucellosis were the main. Interviewee which doesn't consider toxic plant as a cause of abortion were 39 (47.6%) only 3 (3.6%) suspect and believe toxic plant as a cause of abortion the rest respondents doesn't have information whether it can cause abortion or not. Blood sample from 210 sheep and goat were taken for brucellosis screening test showed that, 72 (34.3%) of the blood sample found to be positive for brucellosis. In general the present study conclude that, abortion of small ruminant in the result in massive loss and provide a negative impact on the small ruminant production. So attention should be given on prevention and control of brucellosis and further investigation on abortion causing disease should be done.

Keywords: Abortion, Brucellosis, Cause, Prevalence, Small ruminant

I Introduction

Due to their wide adaptability to climatic condition sheep and goats are raised worldwide. The industry is often the only possible deal in arid, with poor soil inadequate to grow crops or to practice more lucrative livestock such as daily farming it provides subsistence means and occupational for large proportion of rural populations being utilized at the same time as a treasury which is supplied by selling the flocks offspring ⁽¹⁾.

Ethiopia's livestock population (2002) is the largest in Africa, with 30,000,000 cattle; 24,000,000 sheep; 18,000,000 goats; 7,000,000 equines; 1,000,000 camels and 53,000,000 poultry. However, the high population the result from this sector is not enough even to supply the countries demand for meat. Similarly livestock population in Tigray comprises of 2.2 million cattle, 2.5 million sheep, 3 million goats, 3 million chickens, 390, 000 mules, 366,000 donkey, 30,000 camel and 180,000 beehives in cited in ⁽²⁾.

The productivity and production obtained from the subsector is by far low beyond the limit due to various reasons among which poor nutrition and disease are the most blamed one abortion in small ruminant could be genetics nutritional (toxic feed). An outbreak of abortion occurring in a lock, should be immediately identify its specific cause to make a decision for taking a control measure ⁽³⁾.

The infectious disease, known as *Brucella ovis* is a small ruminant causative agent of abortion. Ewes are sensitive to *Brucella ovis* but infection is usually in apparent and results in abortions at late pregnancy ⁽⁴⁾. Since abortion complains of shoat producers was very critical so knowing the cause of abortion is crucial for prevention and control of the disease.

II Methodology and Materials

A. Study area

The study was conducted at Begasheka watershed area which is found is kola Tembien district, central zone of Tigray region, Ethiopia, 100 km to the west of Mekelle, capital of Tigray region. Begasheka watershed located 130 45'N and 130 40'N longitude and 380 55' E and 390 00' E latitude. It has an elevation of 2160 m above sea level the watershed have monomodal rain fall pattern from June to August, which is erratic in nature. There are 8119 sheep and goats found in the area and 789 are sheep and 7330 goats according to report of kola tembien wereda on 2009.

¹ Alemayohu k. livestock population in Ethiopia. 2003., P-35

² Alexsander B., Schurrenberger P.R. Brown R.R. Number of *Brucella abortus* in the placenta, Umbilicus and fetal fluid of two naturally infected cows. Vet Re, 1981, 108.

³ Bosseray N. colonization of mouse placentas by *brucella abortus* inoculated during pregnancy. Brit J exp pathol, 1980, 61, 361-368.

⁴ Haresign W. sheep production butterworths, London, 1983.

B. Study animal and sample type

The study animals were sheep and goat which are found in the watershed area. Blood sample was taken with random selection method from sheep and goat.

C. Sample size determination

The sample size of the study area was determined by using the formula stated by thrusfield ⁽¹⁾. Where prevalence is 50% with confidence interval of 5% to the wareda adjusted population was calculated then proportional distribution was done to the watershed area.

$$n = 1.962 \frac{P_{exp} (1 - P_{exp})}{d^2}$$

D. Study design

The type of the study was cross sectional study. That means blood was taken from sheep and goat randomly selected for rose Bengal agglutination test. A semi open questionnaire survey was prepared and interviewed to sheep and goat owners.

E. Sampling method

This cross sectional study was carried out on 210 sheep and goats with random selection method, which was found in Begasheka watershed area was tested for screening of brucella. And 82 questionnaires were interviewed to sheep and goat owners.

F. Sample procedure

Blood sample was collected from the randomly selected sheep and goat based on the history of the animal. The sample was taken from the jugular vein of the animal with planned tube and then the sample was transported using icebox immediately after collection, sample examination with appropriate screening method of brucellosis (Rose Bengal agglutination test) was undertaken.

G. Questionnaire survey

A semi open structured questionnaire survey was designed to collect data on information related to the cause and occurrence of abortion. In addition, risk factor associated with abortion such as housing system, age during abortion, frequency of abortion, farmers /sheep and goat/ owner's awareness about abortion and nutritional factor (toxic plant) infection nature in the event of an abortion was included in the interview. Accordingly a total of 82 respondents were interviewed.

H. Statistical analysis

The collected data was entered to computer using excel Microsoft ware. SPSS13.0 for windows was used to analyze the result. During the analysis confidence level was held at 95%.

III Result

The result obtain from the questionnaire survey revealed that, from 82 respondents 68 (82.9%) of them were complain abortion and 62 (75.6%) of respondents doesn't consider abortion as a disease (Table 1). In relation to the sheep and goat owned by the respondents, from 471 sheep and goat owned by the respondents 214 (45.4%) were aborted (Table 1).

Table 1. Proportion of abortion of sheep and goat

S/N	Character	Number of participants	Percent
1.	Number of respondents	82	100%
2.	Number of goats owned	471	100%
3.	Number of goats aborted	214	45.4%
4.	Number of aborted goats	202	94.4%
5.	Number of aborted sheep	12	5.6%

Late pregnant abortion complain was 51 (62.2%) and 65 (79.3%) abortion occur in young sheep and goat (Table 3).

Table 2. Perception of respondents on abortion

S/N	Character	Number of participants	Percent
1.	Number of respondents complains abortion	68	82.9%
2.	Number of respondents didn't complains abortion	14	17.1%
3.	Respondents consider abortion as a disease	20 (24.4%)	
4.	Respondents who never consider abortion as a disease	62	75.6%

¹ Thrusfield M. veterinary epidemiology. Survey 2nd Ed. By Blackwell science Ltd., a Blackwell publishing company editorial office. 1995., P-183.

Table 3. Stage of abortion

S/N	Period of pregnancy	Number of participants	Percent
1.	Late pregnant abortion	51	62.2%
2.	Early pregnant abortion	17	20.7%
3.	Non aborted	14	17.1%

Table 4. Frequency of abortion

S/N	Frequency	Number of participants	Percent
1.	One times	20	24.4%
2.	Two time	36	43.9%
3.	Three times	9	11%
4.	Four times	3	3.6%
5.	None aborted	14	17.1%

from the suspected causes of abortion, toxic plant were one of them, in this regard respondents doesn't considering toxic plant as a cause of abortion were 39 (47.6%) only 3 (3.6%) consider toxic plant as a causative agent but the rest respondents doesn't have information (Table 5). From 210 sheep and goat taken blood sample for screening test 72 (34.3%) were positive (Table 6). This indicates that abortion is predominant in the area and the prevalence of brucellosis is high.

Table 5. Considering toxic plant as an abortion causing disease

S/N	Frequency	Number of participants	Percent
1.	Respondents consider toxic plant as abortion causing	3	3.6%
2.	Respondents consider toxic plant as abortion causing	39	47.6%
3.	Respondents didn't know toxic plant as abortion causing I	26	31.7%
4.	None aborted	14	17.1%

Table 6. Laboratory result

S/N	Rose Bengal test	Number of participants	Percent
1.	Positive	72	34.3%
2.	Negative	138	65.7%
3.	Total tested sheep and goat	210	100%

IV Discussion

As the result shown, 82.9% of respondents were complaining abortion. This reveal that there is a massive abortion occur in the area. And from 471 sheep and goat owned by the respondents 45.4% of them were aborted. In the other side respondents who didn't consider abortion as a disease were 75.6% that means the respondents consider abortion as a natural habit of sheep and goat. In relation the housing system 65.9% sheep and goat held in an open air shelter and this can aggravate abortion due to heat and cold stress but respondents never consider this.

Late pregnant abortion was 62.2% this leads us to suspect on late pregnant abortion cause disease like brucellosis like one of the causative agent of massive abortion of shoats. Young's are more sensitive to abortion than adults this was reflected by 79.3% of the aborted animals were young's. Frequency of abortion was from one to four times but 43.9% of aborted sheep and goat were aborted two times. This indicated that there is huge loss on sheep and goat producers of the area.

In regard to toxic plant as cause of abortion 47.8% respondents doesn't consider toxic plant as abortion cause etiology. Only 3.6% of respondents consider toxic plant as a cause abortion. But the rest respondents don't have information about toxic plant so awareness on abortion causes, needs attention. And 48.9% of respondents did nothing after his/her shoat abort this can lead to the elevation on number of aborted sheep and goat and 25.6% give anthelmint tablet, this mistreatment could result on drug resistance. Only 8.5% of them were taken to animal health clinic so the reason why they didn't take to clinic need to be identified. 94.4% of aborted animals was goats this is because brucellosis is a principal disease of goat rarely occur in sheep.

The laboratory result /screening test of brucellosis/ shows that, 34.3% of them were positive for brucellosis. So attention should be taken on prevention and control of the disease. The overall sero-prevalence in this finding is slightly higher than the reports previously done by (1) and (1) in Ethiopia and Egypt, respectively.

¹ Teshale S, Muhie Y, Dagne A, Kidanemariam A (2006). Seroprevalence of small ruminant brucellosis in selected districts of Afar and Somali pastoral areas of Eastern Ethiopia and the impact of husbandry practice. Rev. Med. Vet. 157:557-563

VConclusion and recommendation

According to the result obtain, abortion is a headache of sheep and goat producers of the watershed area. And most farmers or sheep and goat producers doesn't consider abortion as a disease and also most of them held their sheep and goat in open air shelter so awareness creation should be practiced on sheep and goat management. More than half abortions occur in late pregnant shoats. Abortion frequency was from one to four in the life time of sheep and goats of the study area. So this is a huge loss to sheep and goat producers. And besides this respondents didn't consider toxic plant as causative agent of abortion. 94.4% of aborted animals was goats this is because brucellosis is a principal disease of goats rarely occur in sheep in this regard attention should be given to goats than sheep. Most of the sheep and goat producers do nothing after abortion for treatment. The laboratory screening test result also shows that, there was massive loss due to brucellosis.

Based on the above conclusion the following recommendation are forwarded

- The result obtained, abortion is a headache of sheep and goat producers of the watershed area so control and prevention measures of main causes of abortion should be done.
- Further screening and confirmatory test in and around the watershed area should be done.
- Awareness creation on prevention and control of brucellosis for sheep and goat producers should be practiced.

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Conflict of Interest Statement

The authors declare that they have no conflict of interest.

¹ Kaoud A, Zaki M, El-Dahshan R, Nasr A (2010). Epidemiology of Brucellosis among Farm Animals. Nat. Sci. 8:190-197