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Retrospective Study on the Epidemiology of Bovine Anthrax in Elu Aba Bor Zone, South West Ethiopia

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Abstract: This retrospective study was conducted on the Epidemiology of Bovine Anthrax to understand the prevalence, seasonal distribution, the prophylaxis and vaccination coverage and the progress of the Bovine Anthrax based on the data collected through passive surveillance in Elu Aba Bor zone, Oromia region, south west of Ethiopia. The epidemiological data was extracted from the monthly and annual reports of the Livestock Resource Development and Fishery office of each woredas and from the records of veterinary Epidemiology department of Elu Aba Bor zone Livestock and Fishery Resource Development, office, from the period of 2009-2016. During this period the retrospective data results revealed that a total of 405(0.028%), 1166(.o83%) and 739(.05%) anthrax outbreak, cases and deaths in cattle were respectively registered in the Veterinary Epidemiology department at zone level and veterinary clinics in each Woredas. The hot dry season accounted for 29.6% of the outbreaks followed by the rainy and cold dry season (24.69%), and the post-rainy season recorded the lowest (20.99%). There was vaccination and prophylaxis program against anthrax every year in the zone. At the same time, there was a reduction in outbreak, cases and death rate of animals from year to year. However, As it is seen from the data the number of cases and deaths are not proportional, because of failure to make confirmatory diagnoses since the regional laboratory is located very far from the woredas where the data was collected and the coverage of prophylaxis and vaccination is disproportionate to the number of livestock in the Woredas which needs the future attention.

Key words: Anthrax · Epidemiology · Metu

INTRODUCTION

Ethiopia has a large livestock population and many rural communities depend on animals for food, income and draught power. Disease is one of the major constraints preventing these large livestock resources from being fully exploited. Anthrax is an endemic disease which occurs in May and June every year ('anthrax season') in several farming localities of the country, causing disease both in humans and livestock [1]. But in Elu Aba Bor Zone mainly the disease occurs in dry season (December-May).Because in these dry months shortage of grasses are observed and livestock graze up to the end of the roots with soil where there might be spores of anthrax. It is a non-contagious disease caused by a spore-forming, Gram-positive, non-motile bacterium, Bacillus anthracis [2]. The name of the bacterium is derived from "anthrakis", the Greek word for coal, because anthrax in Bovines causes black, coal-like lesions on the skin at the site of inoculation [3].

The disease in animals is characterized by septicemia and sudden death with exudation of tarry blood from the body orifices of the cadaver. Failure of the blood to clot, the absence of rigor mortis and the presence of splenomegaly are the most important necropsy findings of the disease Prior to the development of the anthrax

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vaccine and antibiotics it was the foremost cause of uncontrolled mortality in different species of animals worldwide [4].

Most species of animals like cattle, sheep and goats are the most susceptible species and are frequently found dead, which may lead to the diagnosis being confused with lightning strike, snake bite, or acute poisoning [5]. The disease is less acute, although usually fatal, in camels and horses and results in extensive swelling of the neck and ventral part of the body. Pigs and dogs are more resistant to the bacterium, displaying swelling in the throat region or intestinal signs, such as diarrhea or constipation. Scavenger animals tend to show fewer clinical signs and many birds appear resistant to anthrax, although the disease can be a problem in captive birds, such as ranched ostriches [6].

Herbivorous and wild mammals are most commonly infected by anthrax through ingestion or inhalation of spores while grazing. Ingestion is thought to be the most common route by which herbivores contract anthrax. Carnivores living in the same environment may become infected by consuming infected animals. Human cases usually develop after exposure to infected animals and their tissues [7].

Although several studies on the distribution of anthrax have been done elsewhere [1, 8, 10], no study was yet done on the geographical, seasonal and progress of distribution of anthrax outbreaks in the south west of Ethiopia. Therefore the objectives of this study were: to understand the prevalence of anthrax outbreaks, cases and deaths in cattle, to identify a season of anthrax outbreak, to observe prophylaxis and vaccination coverage and to know the current progress of anthrax outbreaks in the districts.

MATERIALS AND METHODS

Study Area: The study was conducted in Elu Aba Bor zone, Oromia Region, which is located at 600 km west of Addis Ababa. Elu Aba Bor zone is found at the south west Ethiopia and the road taking from Addis Ababa to Gambella crosses the Zone. Wild animals and natural forests are the natural endowments of the Zone. The population is moderately dense. The annual rain fall is one of the highest in the country and receiving an annual rain fall ranging between 1200-2500mm. The longest rainy season/ Summer (Kiremt in Local Amharic language) rain starting in April and steadily increasing to the highest amount from June to August and off sets in October. The others are; the short rain/Meher in Amharic (March to May) and dry season/ Bega (December to February). The zone is known by its mild temperature. The hottest temperature is 25-30°C and the coldest is 7-12°C [11].

Data Collection Method: A retrospective study of the records of anthrax documented in all 22 districts of Elu Aba Bor zone over the past 8 years was reviewed from the records of Veterinary Epidemiology department at the zone level and from the case records at each Woreda. Information regarding the outbreaks each year was extracted from the reports submitted by field veterinarians from around the districts and used for this study reported here. The variables, which were considered in relation to the outbreaks, were factors that contributed to the current progress of the disease outbreak (vaccination and prophylaxes); the topography and the agro ecology of the Woredas for there are three types of agro ecologies in the zone.

Statistical Analysis Method: The data that was extracted from the records of Veterinary Epidemiology department at the zonal level and from the case records at each Woredas were processed (examined) to detect errors and omissions. Lastly the data were coded and entered into the spread sheets of a Microsoft Ex-cell and analyzed.

Seasonal variations were examined by grouping the respective monthly outbreak data over an 8-year (2009-2016) period. For the seasonal analysis, the year was divided into four seasons; rainy (June to August), post-rainy (September to November), cold-dry (December to February) and hot-dry (March to May) seasons. To see the association among season, vaccination and prophylaxis program with the occurrence of the Anthrax outbreak, cases and deaths, Chi-square (x2) test was used. A statistically significant association between variables was considered to exist if the calculated p-value is less than 0.05.Furthermore; data were summarized using frequency tables and bar graphs.

RESULTS

The present retrospective study was conducted on the Epidemiology of Bovine Anthrax to understand the prevalence, seasonal distribution and the prophylaxis and vaccination coverage and the progress of the Bovine Anthrax in the study area. A total of 405(0.029%), 1166(.o83%) and 739(.05%) anthrax outbreak, cases and deaths in cattle were respectively registered over 8 years in the 22 districts of the former Elu Aba Bor zone from 2009 to 2016. The hot dry season accounted for 29.6% of

the outbreaks followed by the rainy and cold dry season (24.69%), and the post-rainy season recorded the lowest (20.99%). Fig. 1 shows the annual number of outbreaks, cases and deaths per 8 year periods. The highest number of outbreaks (84) and (247) cases, and deaths (150) was recorded in 2012, and 2011 respectively. Generally there has been a decrease in the number of outbreaks over the years.

Table 1: Zonal Outbreaks, Cases, Deaths & Population at Risk and Vaccination Control from the year 2009-2016

Year	Outbreak	Cases	Deaths	PAR	Vac/control
2009	46	192	95	44407	27831
2010	67	206	147	53804	29900
2011	74	206	150	78501	57390
2012	84	247	138	153870	69448
2013	68	172	105	287884	110445
2014	29	71	39	270334	43754
2015	8	18	17	259632	13000
2016	17	54	48	261900	27150
Total	405	1166	739	1410332	378918

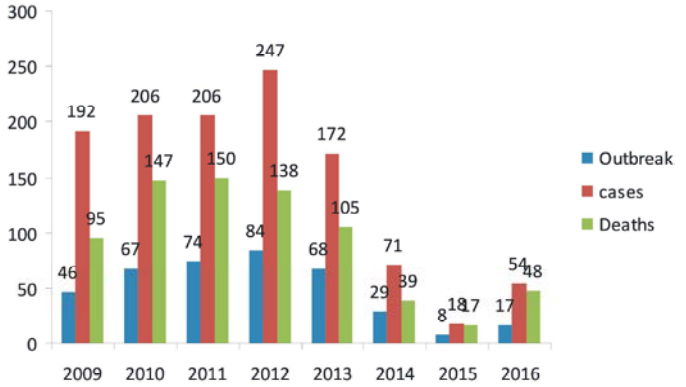

Fig.1: Annual outbreak, cases and deaths of bovine anthrax

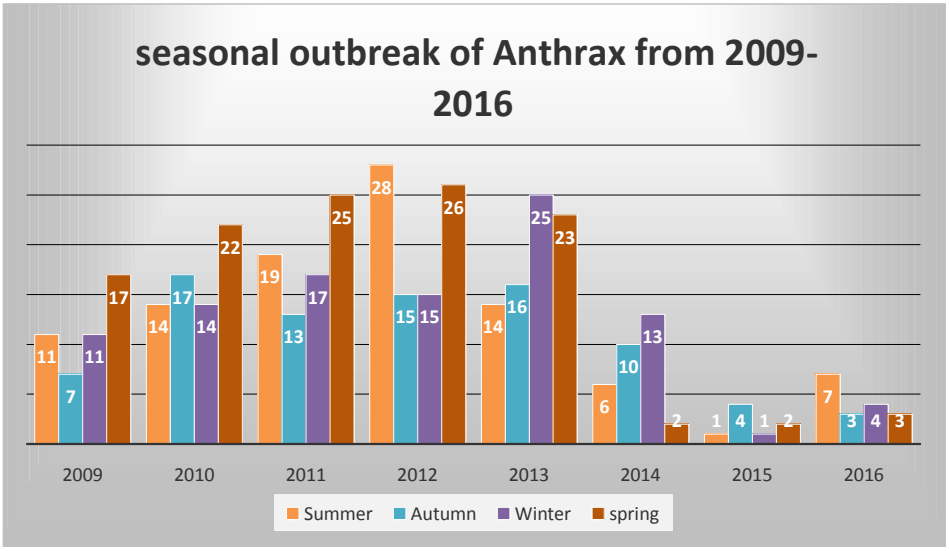

Fig. 2: Seasonal outbreak of Anthrax from 2009-2016

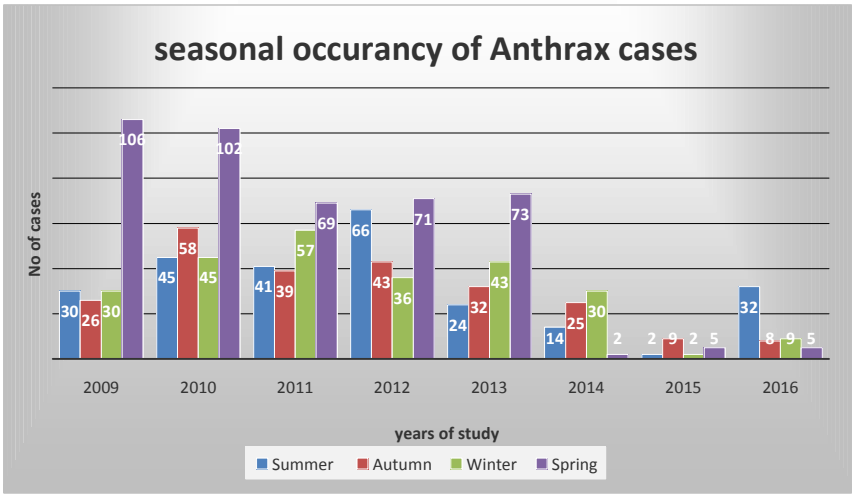

Fig. 3: Seasonal occurrence of Anthrax

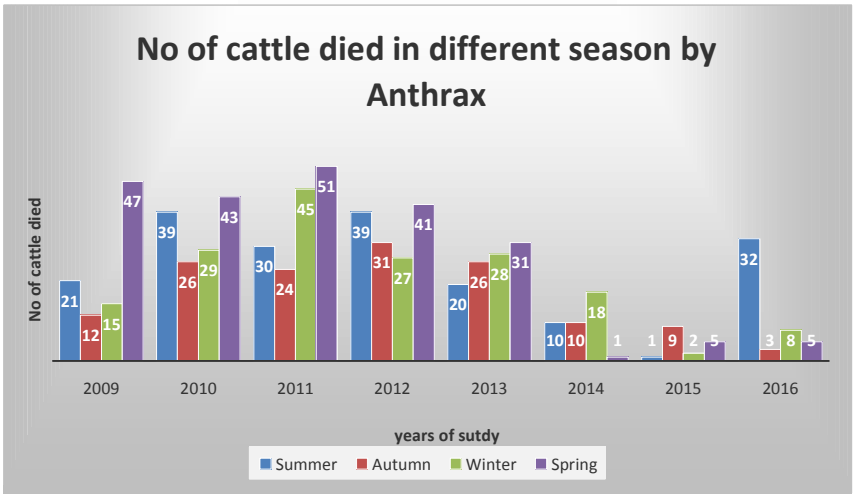

Fig. 4: Deaths of animals by Anthrax

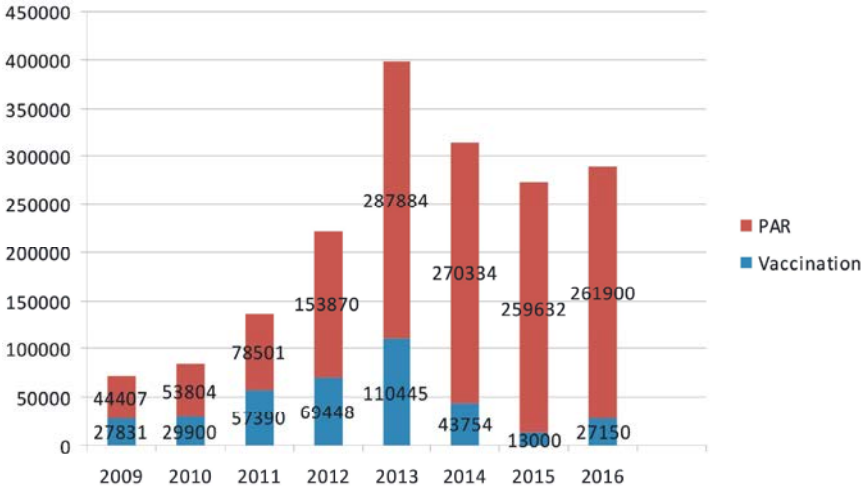

Fig. 5: Vaccinations verses population at Risk (PAR)

DISCUSSION

Anthrax is one of the major constraints preventing large livestock resources from being fully exploited in Ethiopia including the study area over the years and hence should necessarily have a negative impact not only on the economy of livestock rearing but also on public health. However, prior to 2009 the prevalence, seasonal distribution and, the prophylaxis and vaccination coverage and the progress of anthrax could not be accurately determined as data on anthrax and other diseases could not be collected systematically especially in rural areas. Hence, outbreaks, cases and deaths detailed in this study included only those that were reported and recorded to the zonal Epidemiology unit and each weredas veterinary clinics respectively after 2009G.C.

Anthrax outbreak cases and death occurred throughout the year. But the present study revealed that anthrax is a hot dry season disease which accounted for 29.6% of the outbreaks. This is due to deep grazing of animals during this season because of lack of feed and short grass close to the ground. This find agrees with the findings of Hugh-Jones and Blackburn [12] who reported that anthrax seasons have been reported to be characterized by hot-dry weather which stresses animals and reduce their innate resistance to infection allowing low doses of spores to be infective. The spore enters in to the body and causes a serious outbreaks in tropical and sub tropical countries with high rainfall. It is evident that control of the infected animals, prevention of contact with the infected animals and contaminated animal products are quite important to disease control [13] Anthrax is distributed worldwide, but is more common in the tropical than temperate areas. This is due to the high control measures in the developed temperate countries and,

characteristically, due to the fact that anthrax Bacillus spores cannot be formed in cooler environments. The disease has so far been commonly reported in different parts of Ethiopia [14].

Outbreaks are almost evenly distributed over the years with a small decrease in cases and death from 2009 to 2016 (Table 1). This is possibly a result of intensive prophylaxes program which is designed by the livestock resource development and fishery office which play an important role in reduction of outbreaks, cases and death (Fig. 4). Recorded cases of cattle anthrax, from 2009 to 2016, in the study area were observed to decrease from 14%in 2009 to 5.15% in 2012. This might be due to the increasing livestock vaccination records seen across.

CONCLUSIONS AND RECOMMMENDATIONS

In conclusion, this study characterized the general prevalence, seasonal distribution and, the prophylaxis and vaccination coverage and the progress of anthrax outbreaks in Elu AbaBor zone, Oromia region, south west of Ethiopia. There is need to develop differential and confirmatory laboratory diagnosis on the report of outbreaks, cases and deaths, mass vaccination and other preventive systems were recommended to reduce anthrax in high risk Woredas. In case, if outbreak of anthrax occurs, immediately ring vaccination must be done. In addition to this maintenance of effective surveillance systems and improvement of awareness, it is very important to detect and contain outbreaks early.

The cases and deaths should be reported on monthly disease occurrence reporting format (OIE Format), a line list and with case-based and also the case should be reported in specific form of the disease. Continuous data analysis and feedback to all stake holders should be conducted on regular bases so as to improve quality of animal surveillance data.

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