Article

ONE YEAR DESCRIPTIVE ANALYSIS OF REPORTED ANIMAL BITE CASES AT TECHIMAN MUNICIPALITY OF GHANA

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Abstract

Background: Rabies is a fatal but preventable zoonotic viral disease of central nervous system. In the developed countries, rabies is mostly found in wild animals like bats, but the developing countries like Ghana, dogs still carry rabies, and most rabies deaths in people around the world are caused by dog bites. There are limited studies on rabies in the Techiman Municipality, Bono East Region of Ghana. The current study focuses on the incidence of bites and resultant rabies infectivity, management and control in Techiman South Municipality. The objective of this study is to detect the gaps in rabies control and prevention practices while providing information for mass education. ,

Methods: The study design was cross-sectional with Excel Format for the sample collection from the two departments under Veterinary Service Directorate in Techiman that is Disease Investigation Farm (DIF)/Regional Veterinary Laboratory (RVL) and the Municipal Veterinary Clinic (MVC) all in Techiman. In all, 163 reported cases were collected. Data on dog bites and rabies cases in Bono East Region from January to December, 2022 were also analysed.

Results: One hundred and Sixty-three (163) cases of animal bites were reported from January to December 2022. Majority of the animals involved was dogs which were 158 representing 96.93% and 73.61% of dogs were not vaccinated. Complete data was available for 157 completed cases. The age range of reported cases was 11months-83 years with few unknown ages. Nearly twenty-five percent (24.54%) were children under 10 years, majority been males representing 47.85% but slightly above females representing 47.23%. All cases of animal bites were reported first to health facilities before they referral it to veterinary facilities. There was rapid increase of reported cases in the last quarter of 2022 been 83/163.

Recommendation: Ghana Health Service and VSD operated independent systems of zoonotic disease reporting, collected very different sets of information and did not have a common platform for data sharing and reconciliation. This needs to be addressed to ensure better disease information collection, management and dissemination. Animals suspected of having

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rabies on dying have their brains tissue examined at KCCR as DIF/RVL not having the standard equipment for rabies diagnosis.

This calls for upgrading the DIF/RVL and also further improvement in the skills and/or equipment for rabies detection at DIF/RVL. This was the reason why most of the samples were not able to be summited to KCCR due to high cost of transportation to Kumasi.

Keywords: Rabies; Techiman; Disease Investigation Farm (DIF); Regional Veterinary Laboratory (RVL); Municipal Veterinary Clinic (MVC); Rabies virus (RABV); Animal-bite.

INTRODUCTION

Rabies is a viral disease that causes inflammation of the brain in humans and other mammals like cats, dogs, monkeys, others *(Faber et al., 2009)*. Rabies can be prevented by vaccination *(Singh et al., 2017)*. Rabies occurs in over 150 countries and zones in the world according to WHO(Act et al., 1968; Workers, n.d.). Every year about tens of thousands people worldwide die from rabies and most of the death occurs in Africa and Asia*(Rabies et al., 2017)*. WHO agenda that is *"*leads the collective united against Rabies" to drive progress towards "Zero human deaths from dog-mediated rabies by 2030"*(Fitzpatrick et al., 2016; Zinsstag et al., 2009)*.

RABIES IN TECHIMAN

Death causes by rabies in human cannot be mentioned in Ghana without Techiman (Edward *et al.,* 2014). On July, 2022, the Techiman Municipal Health Directorate reported to the Municipal Assembly authorities of the increase in the incidence of rabies related deaths of human in the Municipality which lead to Mass Rabies Vaccination. The reported data are 17, 23 and 6 for the 1st quarter respectively for 2020, 2021 and 2022. Most times animal bites are not reported in Techiman and even those who reports are not helpful the Veterinary Officers in charge complete their investigation. There is also insufficient education on animal bite and rabies, few areas are been covered during mass vaccination campaign due to lack of transportation system for the Veterinary Service Directorate (VSD) in Techiman, no clear quarantine regulations for stray dogs. There is inadequate monitoring of animal and human rabies outbreaks in Techiman due to poor coordination between (VSD) and the Health Facilities in Techiman (Turkson & Wi-afedzi, 2020). Due to the poor infrastructure at Disease Investigation Farm/Regional Veterinary Laboratory and inefficient surveillance is believed to be the failure of most of the rabies reported cases in Techiman and as well as social cultural reasons (Turkson & Wi-afedzi, 2020). Rabies is a viral zoonotic disease that causes inflammation of the brain in humans and other mammals like cats, dogs, monkeys, others (Faber *et al.*, 2009) and can be prevented by vaccination (Singh *et al.*, 2017). Rabies kill once clinical symptoms appear and is nearly 100% deadly WHO, 2014. Rabies occurs in over 150 countries and zones in the world according to WHO(Act et al., 1968; Istikomah & TBSA, 2014; Workers, n.d.) and every year about tens of thousands people worldwide die

from rabies and most of the death occurs in Africa and Asia *(*Rabies *et al.,* 2017). WHO agenda that is *"*leads the collective united against Rabies" to drive progress towards "Zero human deaths from dog-mediated rabies by 2030"(Fitzpatrick *et al.*, 2016; Zinsstag *et al*., 2009).

In up to 99% of cases, domestic dogs are responsible for rabies virus transmission to humans in Techiman Municipal. It is spread to people and animals through bites or scratches, usually via saliva (Turkson & Wi-afedzi, 2020). It is estimated that about 43.56% of people bitten by animals were children under 20 years of age in Techiman according to the reports from DIF / RVL and the MVC all of the TSM of Ghana and about 73.61% were animal that were not vaccinated.

NOMENCLATURE OF RABIES VIRUS

The viruses that cause Rabies disease belongs to the family ***Rhabdoviridae***, order ***Mononegavirales*** and genus ***Lyssavirus*** (Becker *et al*., 2015). Rabies virus (RABV) is among the group of negative-strand viruses which these RNA viruses includes viral pathogens that affect human just like that of influenza viruses, measles virus, Ebola virus and others (Act *et al.*, 1968). According to the International Committee on Taxonomy of Viruses (ICTV) the genus *Lyssavirus* is allocated into diverse virus species based on separation criteria such as *genetic distance, immunological features* and *antigenic patterns* in reactions with panels of antinucleocapsid monoclonal antibodies (Becker *et al.*, 2015) . This separation is further supported by geographic distribution and host range (Blackwood *et al.*, 2013). Lyssavirus species is segregate into two **phylogroups** (The Center for Food Security and Public Health, 2012). Rabies virus (RABV) is the most prevalent and convalesced from animals on land, globally and from ***Chipropteran*** bats in the Americas (Act *et al.*, 1968). Other rabies-related lyssaviruses are more restricted in their host range and geographical distribution (Banyard *et al.*, 2011). In Ghana, the ***RABV Africa 1 lineage*** and ***RABV Africa 2 lineage*** are viruses that cause rabies. (Hayman *et al.*, 2011).

STAGE OF RABIES VIRUS INFECTION

RABV are infectious to mammals like human with three stages of Central Nervous System (CNS) infection are accepted (Goutille *et al.*, 2009).

- The first stage is a one – to three – day period characterized by behavioral changes and is known as the **Prodromal Stage** *(*Fitzpatrick *et al.*, 2016; Zinsstag *et al.*, 2009) .
- The second is the **Excitative Stage**, which lasts three to four days(Act *et al.*, 1968; Singh *et al.*, 2017). This stage is also known as "**Furious Rabies**" for the tendency of the affected animal to be hyper – reactive to external stimuli and bite at anything near(East *et al.*, 2001; Rabies *et al.*, 2017; Requirements *et al.*, 2014; World Health Organization (WHO), 2014).

- The third is the **Paralytic Stage** and is caused by damage to motor neurons(Singh *et al.*, 2017; The Center for Food Security and Public Health, 2012). Rabies virus (RABV) is enzootic throughout Africa with the domestic dog (***Canis familiaris***) being the principal vector (Hayman *et al.*, 2011). For example, animals like dogs, cats and monkey bite in Techiman South Municipality of Ghana.

STATEMENT OF THE PROBLEM

- According to the veterinary personnel at in Techiman Municipal, many people fail to vaccinate their animals against rabies because of the lack of education on rabies in the public domain.
- Moreover, there is lack of mass rabies vaccination and education in the communities on rabies. As most people don't know what to do when they are bitten by an animal by going to the hospital or veterinary office. The result is that most health officers are unable to help them out of their problems due to lack of information.
- In an attempt to restrain animals from biting humans with several problems and restrains have been identified (Number *et al.*, n.d.). Some of these problems include finance (Act *et al*., 1968), low level of knowledge (Tenzin *et al.*, 2012) and poor working conditions for staff(Act *et al.*, 1968).

OBJECTIVES OF THE RESEARCH

General Objectives: To compare the vaccination history of dogs and cats in Techiman Municipal with respect to positive rabies confirmed cases.

Specific Objectives:

i. To compare the report of animal-bite (dogs, cats and monkey) cases, investigations and management of animal-bite.
ii. To compare the ages of people bitten by dogs and cats and those that tested positive.

METHODOLOGY

A Community Survey in Techiman South Municipality

Techiman is located at a historical crossroads of trade routes and the Tano River, and serves as capital of is the capital of Bono East Region with the coordinates of 07°34′38″N 01°55′45″W. Techiman covers a land area of 647.6 km^2 (Ghana Statistical Service, 2014) with the Population Density of 375.8 km^2 (Assembly, 2014).

The Techiman Municipality covers three major vegetation zones, namely: Guinea-Savanna woodland in the north-west, Semi-Deciduous Zone in the South, and the Transitional Zone extending from the South-East and West to the North (Ghana Statistical Service, 2014). The main occupation is agriculture including crop production and livestock production. Aquaculture is on the edge of progress and a small percentage of the land undergoing replanted to join Asubima Forest Reserve (Ghana Statistical Service, 2014).

Techiman is one of Ghana's busiest cities as it's generally considered as one of the country's top commercial centers. Techiman is home to West Africa's largest traditional market (Ghana Statistical Service, 2014). It is visited by traders from Togo, Benin, Côte d'Ivoire, Burkina Faso, and Mali (Assembly, 2014). Techiman is commonly referred to as the "*Food Basket of Ghana*" (Ghana Statistical Service, 2014) due to the fact that its market operations take place from Tuesday through Friday every week of the year, attracting traders from around West Africa. Due to the city's socioeconomic structure, Techiman's population is very cosmopolitan, consisting of individuals from many racial, economic, and social-political backgrounds (Assembly, 2014).

The municipality has a total human population of 243,335 (118,699 were males and 124,636 were females) according to GSS Population Census 2020. Ninety percent of the population in the district are rural inhabitants(Assembly, 2014; Ghana Statistical Service, 2014). The Techiman Municipal constitute of five sub structures or zonal councils, namely: *Techiman Zonal Council*, *Tanoso Zonal Council*, *Tano Zonal Council*, *Nsuta Zonal Council* and *Nkwaeso Zonal Council* (Assembly, 2014; Ghana Statistical Service, 2014) and comprises 24 smallest administrative unit (Assembly, 2014). The study will be conducted in five of these administrative units according to animal bite reporting.

According to the Municipal Veterinary Officer there are about Eight thousand Dogs, Cats and Monkeys in TSM which about eighty-five percent are pure breeds and fifteen percent are Cross breed.

SCOPE OF THE STUDY RESEARCH

The data for reported cases of animal bite was recorded from January, 2022 to December, 2022. The *coverage areas for this study were communities that people reported of dogs, cats or monkey bite* to the Veterinary Service Directorate of Techiman Municipality. The data for animal bite was correct from the two departments under Veterinary Service Directorate in Techiman that is DIF / RVL and the MVC all in Techiman.

DATA COLLECTION AND STATISTICAL ANALYSIS

Records on animal bites, rabies cases, and dogs, cats, and monkey vaccinations other were obtained from MVC and DIF/RVL from January – December 2022.

DISCUSSION

The most common animal bite (dogs, cats and monkeys) cases reported to Municipal Veterinary Clinic and Disease Investigation Farm/Regional Veterinary Laboratory during the study period were canines (dogs) as shown on *Tab 1*. This led to the increase in rabies cases in Techiman South Municipal. There is gradual increasing from January to December, 2022 as seen in *Tab. 6*. The increase in the reporting was due to sanitization on animal bite and rabies recently in Techiman by the Veterinary Service Directorate and Ghana

Health Service. However, (Adomako *et al*) noted that parallel and uncoordinated systems of rabies surveillance maintained separately by the health and veterinary services resulted in gross disparities and underreporting of the numbers of cases. The high number of unknown age group in the current study may be due to same reason during the period.

In *Tab. 4*, it was shown that One hundred and twenty (120) animals representing 73.61% of the animal were not vaccinated may be due to the high cost of vaccination in the Municipality and low level of information or education on animal health and high risk rabies and consequences of rabies infection in the Municipality. Due to the high rate of unvaccinated dogs, cats and monkeys in the municipality, there was also high rate of Rabies Positive Confirmed Cases in animals from their brain tissues sent to the laboratory (Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) for confirmation. Out of 10 samples sent from August to December, 2022, eighty percent (80.0%) was confirmed positive according to DIF/RVL. The positives were quite high in number. As compare to, (*Punguyire et al., 2017)* reported 3.30% to 17.6% positive animal samples in Techiman for the period 2006 to 2011. Furthermore, according to the reporting, it is estimated that about 40 people representing 24.5% of the total number of people bitten by animals were children less than 10 years in Techiman South Municipal as shown in *Tab. 2*. This happens as a result of children moving from one place to another. The year under review showed that about as 47.2% were female, 47.9% were male, 3.7% for those did not involve human and 1.2% was not known as shown in *T ab.3*. As a matter of fact, some of the victims and owners did not help the MVC and DIF/RVL to complete the investigation as shown on *Tab.5*

Tab 1: Species of Animal that bite people

Animal Spices	N	%
Canine (Dogs)	158	96.93
Feline (Cats)	4	2.45
Monkey	1	0.62

Tab 2: Age Range of People that were bitten

Age Range	N	%
≥ 10	40	24.54
11 – 20	31	19.02
21 – 30	16	9.82
31 – 40	16	9.82
41 – 50	7	4.29
51 – 60	9	5.52
≤ 61	4	2.45
Unknown	34	20.86
No Human Bite	6	3.68

Tab 3: Sex of People that were bitten

Sex	N	%
Male	78	47.85
Female	77	47.23
Unknown	2	1.24

No Human Bite	6	3.68

Tab 4: Vaccination Status of Animals that bite people

Vaccination Status	n	%
Vaccinated	29	17.79
Unvaccinated	120	73.61
Unknown	9	5.52
Animal was not available	**5**	**3.08**

Tab 5: Status/Level of Investigation

Handling/Monitoring	n	%
Complete	**118**	**72.38**
Incomplete	**31**	**19.02**
Still Ongoing	6	3.68
Animal was not available	**5**	**3.08**
Decomposed Carcass	**3**	**1.84**

Tab 6: Level of bite in each month.

Months	n	%
January	10	16.13
February	10	16.13
March	7	4.29
April	10	16.13
May	16	9.82
June	10	16.13
July	9	5.52
August	8	4.91
September	13	7.97
October	27	16.57
November	28	15.96
December	17	10.44

Artwork

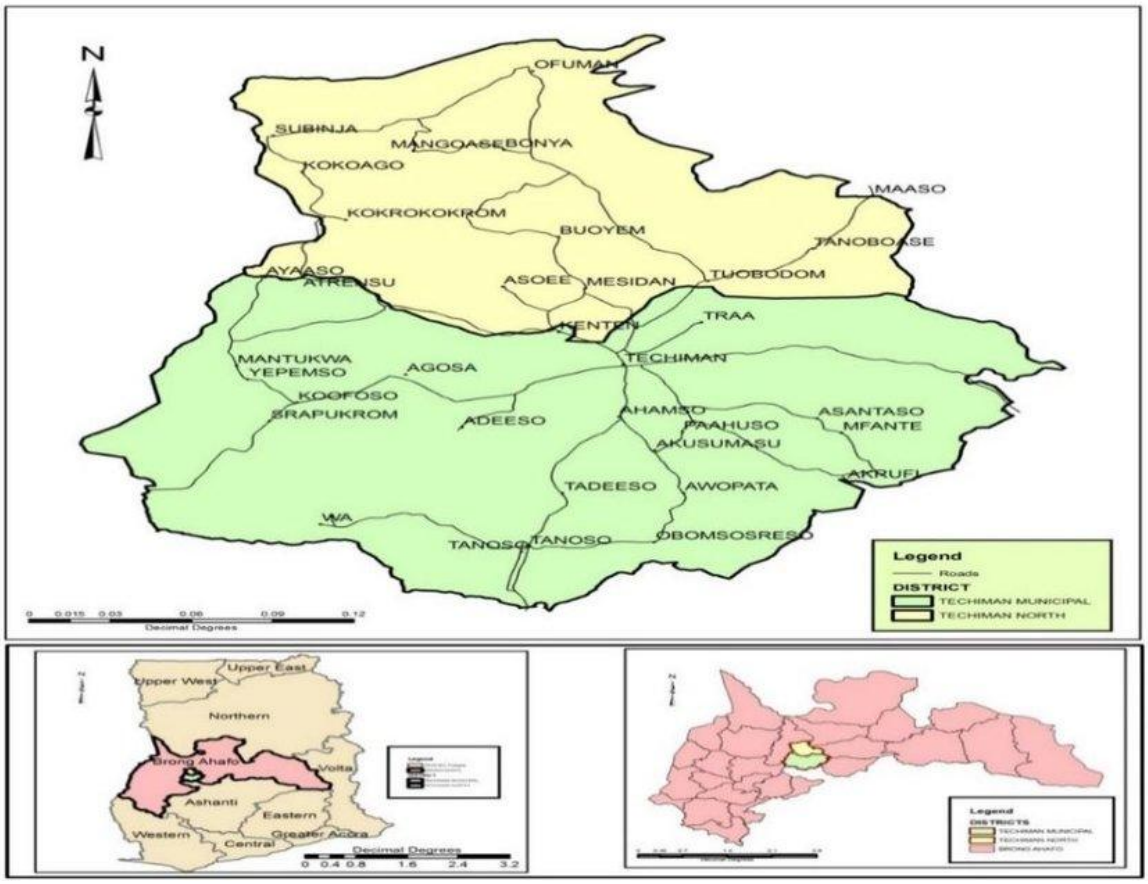


Fig. 1 Map of Techiman Municipal of Bono East Region, Ghana (researchgate.net.png).

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