



Retrospective Study on Puppy Bites Reported to Veterinary Clinic, Federal College of Animal Health and Production Technology, Vom, Plateau State from 2004 to 2010.

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ABSTRACT

In a retrospective study of puppy bite cases, a total of 130 cases of bites were analyzed using seven years records of puppy bites obtained at the Veterinary Clinic of the Federal College of Animal Health and Production Technology, Vom, Plateau State. Of these, 53.1% (69/130) and 46.9 (61/130) were bites from male and female puppies respectively. This was statistically insignificant ($p > 0.05$). Based on age groups, cases of bites were highest 39.2% (51/130) and lowest, 19.2% (25/130), for age groups $>2-4$ and $0-2$ respectively. The highest cases of bites, 22.3% (29/130) were recorded in 2004, while 2006 had the lowest with 11.5% (15/130) which was statistically insignificant ($p > 0.05$). Also 60.0% (78/130) of the bite cases were as a result of provocation while the remaining 40.0% (52/130) were unprovoked bites. The outcome of fluorescent antibody test showed that 33.1% (43/130) of the puppies were positive for rabies. Also of this 33.1% positive samples, 22.3% (29/130) and 10.8% (14/130) were males and females respectively. This was statistically significant ($p < 0.05$). The highest apparent prevalence was obtained in Jos South 12.3% (16/130), while the lowest was in Shendam 0.8% (1/130). None of the cases from Pankshin was positive for rabies. Also Jos South recorded highest number of cases 55 (42.3%), while the least were in Langtang and Shendam with 3 (2.3%)

each. The results showed that puppies below the age of three months can come down with rabies. It is recommended that the age for rabies vaccination in Plateau State and Nigeria at large where the disease is endemic be reconsidered especially where bitch immunization is uncertain.

Key words: Puppy bites, rabies, retrospective study, fluorescent antibody test, Plateau State.

INTRODUCTION

Rabies is an acute, highly contagious, and fatal disease of warm-blooded animals characterized by a long and variable incubation period (Awoyomi *et al.*, 2007). It is an infectious viral disease of the Central Nervous System (CNS) leaving victims suffering from convulsions, paralysis, excessive salivation, and an aversion to water leading to death of affected animal in most cases (Beard, 2001). Two types of rabies cycles exist, and these include the sylvatic and urban types. In the sylvatic cycle, the infection is maintained as an enzootic disease in several species, such as foxes, raccoons, and bats (Salmón-Mulanovich *et al.*, 2009). The disease is an acute progressive encephalitis characterized by changes in behavior like agitation, excitation, and drooling of saliva. At first there might not be any symptoms, but weeks, or even years after a bite, rabies can cause pain, fatigue, headache, and fever. These are followed by

seizures, hallucinations, and paralysis. There have been fewer than five known cases where recovery has occurred (Beard, 2001). It is caused by rabies virus, which is a bullet-shaped, enveloped RNA virus belonging to the family rhabdoviridae and genus *Lyssavirus* type 1 (Knobel *et al.*, 2005; Salmón-Mulanovich *et al.*, 2009).

Globally, over 55,000 annual deaths are recorded as a result of rabies with 99% of these deaths in the countries of Africa and Asia (WHO, 2005). In Nigeria, it is estimated that 10,000 cases of human rabies occur annually (Nawathe, 1980). The disease remains a very important public health issue in Nigeria and West Africa. It is the most important zoonotic disease in the country that causes a lot of fear to the populace (Suzuki *et al.*, 2008).

The disease was first reported in Nigeria in 1912 in two persons, but the first laboratory confirmation was in 1925 by the demonstration of negri bodies in the brain smear of a rabid dog (Boulger and Hardy, 1960). It remained an endemic problem since then (Umoh and Belino, 1978; Nawathe, 1980). The vaccination of dogs and control of stray dogs still remain the major control strategy (Umoh and Belino, 1978; Meslin *et al.*, 1994). In Nigeria, the dog alone plays about 94% role in the transmission of rabies from animal to animal and animal to man, while animals such as cats, monkeys and others make up the remaining 6% (Ogboegbulem, 1994).

Attempts for the control of rabies is dated as far back as 1885 when Pasteur made the first vaccine to be used in both animals and man. In Nigeria, the modified live virus vaccine-low egg passage produced in 1956 and the high egg passage produced in 1970 for dogs and cats respectively targeted disease control (Ogboegbulem, 1994). Usually humans contract rabies through

rabid animal bite. However, human-to-human transmission of rabies virus occurred through organ transplantations. Furthermore, the virus can be transmitted through corneal transplantation from an infected donor and viral inhalation may also result in infection (Takayama, 2005). This retrospective study aims at analyzing records of puppy bite cases, circumstance that influenced the bite, management of bites, and outcomes of laboratory results of heads of puppies submitted by victims for laboratory analysis.

MATERIALS AND METHODS

Study Area: This study covered ten LGAs of Plateau State where cases of puppy bites were reported from. These include Barkin Ladi, Bokkos, Jos South, Jos North, Langtang, Mangu, Pankshin, Quanpam, Ryom, Shendam, and others. Others covered all cases submitted without records of location.

Records: A retrospective study was carried out on the records of bites by puppies reported to the Veterinary Clinic of the Federal College of Animal Health and Production Technology, Vom (VCFAH & PTV) between 2004 and 2010. Records of puppy bites were considered in relation to LGAs, sex and age groups of puppies. Records obtained also included circumstances of bites as well as outcome of Fluorescent Antibody Test (FAT) conducted on the heads of puppies at the Rabies diagnostic laboratory of National Veterinary Research Institute (NVRI) Vom. Records of receipt of human post exposure prophylaxis by victims were also considered.

All cases of dog bites from both male and female dogs less or equal to six months of age submitted to the VCFAH & PTV between 2004 and 2010 were included in the study while cases of dog bites from dogs of age greater than six months were

excluded.

Ages of puppies were grouped into 0-2 months, >2-4 months, >4-6 months, and unspecified. The unspecified group included all puppies registered as puppies without age specification.

Fluorescent Antibody Test (FAT):

Heads of puppies involved in bites were subjected to the FAT at rabies diagnostic unit of the Central Diagnostic Laboratory, National Veterinary Research Institute, Vom, according to the protocol described by OIE (2010). All results were expressed as percentages and subjected to Chi square (X^2) test. Values of $p < 0.05$ were considered significant.

RESULTS

A total of 130 cases of puppy bites were recorded during the period under review (Tables 1, 2, and 3). Table 1 shows cases of puppy bites in relation to age groups and sex of puppies. The age group >2-4 months recorded highest cases of bite with 39.2% (51/130) while the lowest was observed among puppies within the age group 0-2 months with 19.2 (25/130). Male puppies recorded higher number of bites 53.1% (69/130) than females 46.9% (61/130) as shown in Table 1.

Based on years, 2004 recorded highest cases of puppy bites with 29 (22.3%) and the lowest was in 2005 with 13 (10.0%) as shown in Figure 2. The years 2006, 2007, 2008, 2009, and 2010 recorded 15 (11.5%), 17 (13.2%), 22 (16.9%), 18 (13.8%) and 16 (12.3%) cases of puppy bites respectively (Figure 1).

Based on LGAs, Jos South recorded the highest cases of bites 42.3% (55/130), while the lowest numbers of cases were recorded in Langtang and Shendam each with 2.3% (3/130) as shown in Table 2. It was observed that 60.0% (78/130) and 40.0% (52/130) of the bites were due to

provocation and unprovocation respectively (Table 2). Based on LGAs, the highest 25.3% (33/130) and lowest 0.8% (1/130) of provoked bites were recorded in Jos South as well as Mangu and Shendam LGAs respectively. Cases of unprovoked bites were highest in Jos South with 16.9% (22/130) and lowest in Quampan and Langtang LGAs each with 0.8% (1/130) as shown in Table 2. Also 12.3% and 20.8% of the FAT positive cases were due to provocation and unprovocation respectively (Table 5).

The overall apparent prevalence of rabies from these records was 33.1% (43/130) as shown in Tables 3, 4, and 5. The highest apparent prevalence of 12.3% (16/130) was recorded in Jos South (2/3) while the lowest was recorded in Quampan and Shendam with 0.8% (1/130) each. It was also observed that 22.3% (29/130) and 10.8% (14/130) of the FAT positive cases were males and females respectively (Table 4). None of the cases from Pankshin was positive for rabies (Table 3).

Also out of the 130 human victims bitten by these puppies, about 44.6% (58/130) received human post exposure prophylaxis (Table 3). The receipt of PEP by victims was highest in Jos South LGA 18.4% (24/130) as shown in Table 3.

DISCUSSION

The high number of puppy bites observed in these records maybe associated with the increasing demand for dogs in the State for meat, security, and companionship. The apparent prevalence of 33.1% of this highly pathogenic viral zoonosis obtained from this study is actually high. This may probably be as a result of the increasing demand for dogs in the State. The proximity of the State with the Yankari game reserve of the neighboring Bauchi State may be an additional factor, since wildlife species such as non-human primates and foxes are said to serve as

possible reservoirs responsible for the transmission and maintenance of the disease in human population (Adedeji *et al.*, 2010). The high demand for bush-meat in the State led to an increase use of domestic dogs in hunting wild life species (Chomel *et al.*, 2007) which could be an additional factor for the high cases of rabies in the State. Plateau State is a centre for dog trade, and some of these dogs are captured from the wild which may be another possible reason for the high prevalence of rabies in the State. Lack of vaccines and non vaccination of bitches can expose the puppies to rabies infection. The use of non potent vaccines in vaccination of dogs and bitches may result in vaccine failure and rabies in puppies (Chukwuedo and Olabode, 2000).

The highest number of cases of bite recorded in Jos South LGA may be due to the close proximity of the LGA to the Veterinary clinic where the records were obtained. The proximity would have made it easier for dog owners and victims of dog bites to report cases of bite. The least reports observed in Langtang, Shendam, and Quampan LGAs may not be unconnected with their distance to the Veterinary Clinic of the FCAH & PTV, where this data were obtained. Also the low number of positive cases recorded in Quampan and Shendam LGAs might be due to the fewer number of cases of bite submitted from these areas.

The higher cases of bite recorded among the age group >2-4 months may not be unconnected with the increased activity of puppies at this age group when compared with the less active 0-2 months that recorded lowest cases of bite. The occurrence of rabies in puppies within ages 1-6 months agreed with the findings of Adeyanju and Addo (1977), that rabies can infect dogs less than or up to three months old. The circulation of rabies virus in

puppies less than three months of age may suggest the absence of maternal antibodies in these puppies or vaccine failure especially from vaccinated puppies (Chukwuedo and Olabode, 2007).

The higher cases of bites among male puppies as compared to the females although statistically insignificant may be due to higher activity of the males when compared to the females. This same reason may explain why male puppies recorded higher positive cases than the females. The higher activity of the males would have probably increased the exposure to stray and possibly rabid dog bites.

The cases of unprovoked bites that were positive to the fluorescent antibody test were statistically higher than the provoked bites. This may not be unconnected with the increased aggressiveness associated with rabid dogs.

Though anti-rabies vaccine is recommended in puppies three months old, the records analyzed by this study showed a reasonable number of positive cases between the age group 0-2 months. This may be associated with failure of transfer of maternal immunity to puppies from either unvaccinated bitches or as a result of vaccine failure (Okoh, 1982).

The observation of higher number of bites in 2004 as compared to the other years may be connected with the careless attitudes of dog owners, provocation of dogs by victims, and inability of dog owners to adequately house their animals, or lack of the knowledge of public health importance of rabies in dogs.

The number of victims that received at least a single dose of human Post Exposure Prophylaxis (PEP) following bite is less than those bitten by puppies. This may probably be due to economic reasons (Zinsstag *et al.*, 2007). The study showed

that about 44.6% of dog bite victims within the period under review received PEP. This is slightly above the report of Okolo, (1989) who reported 38% receipt of PEP. This difference may not be unconnected with increased awareness on the risk of been infected with the disease and the danger posed by rabies in human exposure. It is

therefore suggested that all bitches be vaccinated and screened for post-vaccination antibodies against rabies to ensure that they have immunity against the disease and also the age of dog vaccination against rabies be reconsidered in Plateau State and Nigeria at large especially when bitch immunization is

TABLE I: Age and Sex based distribution of puppy bites.

Age group (Months)	Sexes of puppies					
	Cases of bite (%)		Males (%)		Females (%)	
0 – 2	25	(19.2)	11	(8.5)	14	(10.8)
>2 – 4	51	(39.2)	30	(23.1)	21	(16.2)
>4 – 6	28	(21.6)	16	(12.3)	12	(9.1)
Unspecified	26	(20.0)	12	(9.2)	14	(10.8)
Total	130	(100.0)	69	(53.1)	61	(46.9)

$X^2 = 2.19, P \text{ value} = 0.5340, df = 3$

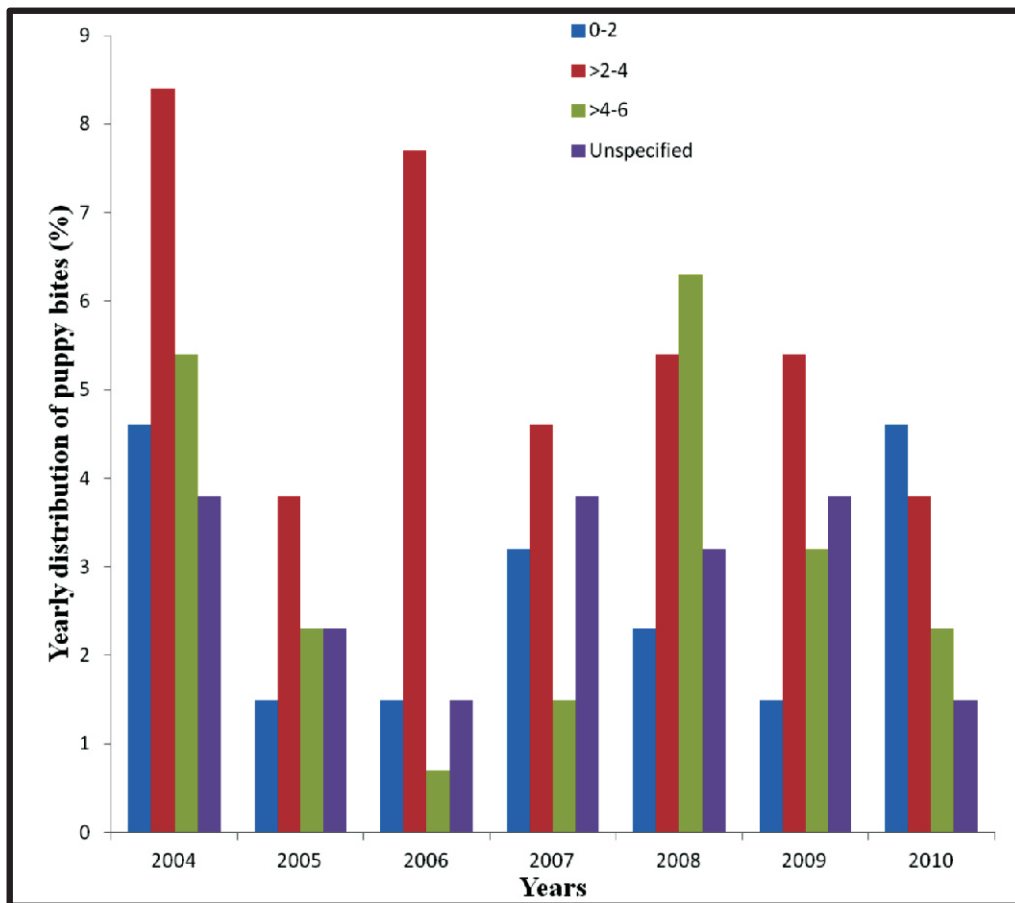


FIGURE 1: Yearly distribution of puppy bites in relation to age groups.

TABLE II: Circumstances of bites of puppies in relation to Local Government Areas.

LGA	Circumstance of bite					
	Cases of bite (%)		Provoked (%)		Unprovoked (%)	
Barkin Ladi	15	(11.5)	10	(7.7)	5	(3.8)
Bokkos	9	(6.9)	6	(4.6)	3	(2.3)
Jos South	55	(42.3)	33	(25.3)	22	(16.9)
Jos North	6	(4.6)	5	(3.8)	1	(0.8)
Langtang	3	(2.3)	2	(1.5)	1	(0.8)
Mangu	6	(4.6)	1	(0.8)	5	(3.8)
Pankshin	5	(3.8)	2	(1.6)	3	(2.3)
Quanpan	4	(3.2)	3	(2.3)	1	(0.8)
Ryom	13	(10.0)	7	(5.4)	6	(4.6)
Shendam	3	(2.3)	1	(0.8)	2	(1.6)
Others	11	(8.5)	8	(6.2)	3	(2.3)
Total	130	(100.0)	78	(60.0)	52	(38.4)

TABLE III: Apparent prevalence of rabies among puppies based on Local Government Areas.

LGAs	Outcome of FAT							
	Cases of bite (%)		No. Positive (%)		No. Negative (%)		Receipt of PEP (%)	
B/Ladi	15	(11.5)	5	(3.8)	10	(7.7)	10	(7.7)
Bokkos	9	(6.9)	4	(3.1)	5	(3.9)	5	(3.9)
Jos South	55	(42.3)	16	(12.3)	39	(30.0)	24	(18.4)
Jos North	6	(4.6)	4	(3.1)	2	(1.5)	2	(1.5)
Langtang	3	(2.3)	2	(1.5)	1	(0.8)	1	(0.8)
Mangu	6	(4.6)	2	(1.5)	4	(3.1)	4	(3.1)
Pankshin	5	(3.8)	0	(0.0)	5	(3.8)	1	(0.8)
Quanpan	4	(3.2)	1	(0.8)	3	(2.3)	2	(1.5)
Ryom	13	(10.0)	4	(3.1)	9	(6.9)	6	(4.6)
Shendam	3	(2.3)	1	(0.8)	2	(1.5)	1	(0.8)
Others	11	(8.5)	4	(3.1)	7	(5.4)	2	(1.5)
Total	130	(100.0)	43	(33.1)	87	(66.9)	58	(44.6)

$X^2 = 8.18, P \text{ value} = 0.6110, df = 10$

TABLE IV: Sex based apparent prevalence of rabies among puppies.

Sex	Positive (%)		Negative (%)		Total	(%)
Male	29	(22.3)	40	(30.7)	69	(53.1)
Female	14	(10.8)	47	(36.2)	61	(46.9)
Total	43	(33.1)	87	(66.9)	130	(100.0)

$X^2 = 5.32, P \text{ value} = 0.0210,$

TABLE V: Apparent prevalence of rabies among puppies based on circumstance of bite.

Circumstance of bite	No. Positive	(%)	Negatives	(%)	Total	(%)
Provoked	16	(12.3)	62	(47.7)	78	(60.0)
Unprovoked	27	(20.8)	25	(19.2)	52	(40.0)
Total	43	(33.1)	87	(66.9)	130	(100.0)

$X^2 = 13.91, P \text{ value} = 0.0002,$

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