



A retrospective study of dog bite cases reported to some hospitals in Plateau State, Nigeria

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Abstract

Dog bite exposes victims to many potential zoonoses, particularly rabies which is feared because of its extremely high fatality rate of almost 100%. This study was carried out to evaluate the incidences of dog bite reported to some human hospitals in Plateau State, Nigeria and to provide data that will help in planning of rabies control programmes in the state. Information retrieved from the hospitals include date of bite, location of bite, age and sex of the victims for the period of January, 2007 to December, 2016. Descriptive statistics was used to analyze the data and the results were presented in tables. A total of 884 dog bite cases were reported in 9 hospitals visited across the state; the highest cumulative number (85 cases) was reported in April followed by 84 cases in May and 81 cases in October. Furthermore, there were more male (53.39%) victims of dog bite than female (46.61%) victims as well as more adult (53.51%) victims than children (46.49%) below 15 years of age. It can be concluded from this study that there is a high incidence of dog bite cases in the state. The presence of two popular dog markets located in Jos South and Kanke Local Government Areas of Plateau state could possibly play a significant role in the high incidences of dog bite cases recorded in this study. Hospitals in Plateau State should endeavor to improve on their record keeping of dog bite cases as this will help health workers in planning of rabies control programmes.

Keywords: Dog Bite, Hospital, Plateau State, Retrospective Study

Introduction

Rabies is exceptionally fatal encephalitis caused by a *Lyssavirus* in the family *Rhabdoviridae* transmitted through the bite rabid dogs, but in rare instances by scratches (Goonaratna *et al.*, 1997). Dog bite poses a major public health threat both in developed and developing nations. In addition to the severe

physical trauma and potentially permanent disfiguring wounds, dog bite victims often go through emotional pain (Chornel & Trotignons, 1992).

Bites from dogs expose victims to many potential zoonoses, particularly rabies which is feared because

of the extremely high fatality rate of almost 100% (Peters *et al.*, 2004). In addition, reports from rabies endemic areas have consistently indicated that apparently healthy dogs could shed rabies virus in their saliva for long periods without showing signs and symptoms of the disease (Fekadu, 1975). It is globally recognised that the number of rabies related deaths officially reported in most developing countries greatly underestimates the true incidence of the disease, with several factors contributing to widespread underreporting (WHO, 2005; WHO, 2013).

Based on published reports, dog bite cases have been reported in some parts of Nigeria, including Plateau State. Bata *et al.* (2011) reported a total of 247 dog bite cases between May, 2009 and June, 2010 presented to ECWA Veterinary Clinic Bukuru, Plateau State, Nigeria. Garba *et al.* (2014) reported 223 dog bite cases from 11 hospitals in Niger State, Nigeria over a period of 8 years. Hence, the need to carry out further study on dog bite cases reported to some hospitals in Plateau State became necessary. Plateau State is also known to have one of the most flourishing dog markets in Nigeria, where slaughter and purchase of dogs and dog products take place (Sabo *et al.*, 2008). There is a possibility of these markets contributing to the increased incidence of dog bite cases in the State as prevalences reported (Sabo *et al.*, 2008; Sabo, 2009; Konzing, 2014; Konzing *et al.*, 2015).

This study will help to provide information and data that will help in the planning of rabies control programmes in Plateau State and Nigeria at large.

Materials and Methods

Ethical clearance

Before the commencement of the study, ethical clearance was obtained from the Plateau State Ministry of Health and Plateau State Hospital Management Board through the Department of Veterinary Public Health and Preventive Medicine, Ahmadu Bello University Zaria.

Study area

Plateau State is located in the middle belt of Nigeria. It is surrounded by Bauchi State to the North East, Kaduna State to the North West, Nassarawa State to the South West and Taraba State to the South East. The state is located between 9.2° and 9.4°N, and between 9.3° and 9.4° E. The altitude ranges from around 1,200 meters (about 4000 feet) to a peak of 1,829 metres above sea level in the Shere Hills range near Jos. It has an area of 26,889 square kilometres,

and is celebrated as "The Home of Peace and Tourism", with an estimated population of about 3.5 Million people (Blench *et al.*, 2003). The population of the state is made up of urban and rural dwellers; the rural dwellers are predominantly peasant farmers who are also involved in socioeconomic activities like animal rearing. The urban dwellers are mostly civil servants, industrialists and traders. Dog markets are located at Dawaki in Kanke Local Government Area (LGA) and Bukuru in Jos South LGA (Sabo *et al.*, 2008; Konzing *et al.*, 2015). No veterinary services and provided and no vaccination of dogs is practiced at the dog markets. The state has over forty ethno-linguistic groups which includes; "Berom", "Hausa", "Mwaghavul", "Ngas", "Taroh" "Goemai", etc (Blench *et al.*, 2003).

Study design

Three general hospitals, three missionary hospitals, two primary health care providers and one tertiary health care provider were selected and visited across the three senatorial zones of the State. Information retrieved from the hospitals included date of bite, location of bite, age and sex of the victims for the period of January, 2007 to December, 2016.

Statistical analysis

Chi-square test using the statistical packages for social sciences (SPSS) software version 22 was used to analyse the data and the P-value obtained was used to test for statistical significance of the variables and the results were presented on tables.

Results

A total of 884 dog bite cases were reported in the nine hospitals visited during the period (January, 2007 – December, 2016) of this study. The findings of this study showed that the highest number of cases (146 cases) occurred in the year 2009 and the least (37 cases) was reported in 2007 (Table 1). Vom Christian Hospital (VCH) documented the highest number of cases (425 cases) and the least (5 cases) was reported by COCIN Comprehensive Hospital, Mangu. However, there were no records of dog bites from Our Lady of Apostle Hospital Zawan, Pankshin General Hospital and Mikang General Hospital (Table 1).

The highest cumulative number of cases (85 cases) was reported in April followed closely by 84 cases in May and only 51 cases in January as the least for the 10-year study period (Table 2).

Furthermore, there were more male (53.39%) victims of dog bite than female (46.61%) victims,

Table 1: Annual distributions of dog bite cases in Plateau State, Nigeria Jan. 2007- Dec. 2016

Year/ Hospital	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
VCH	24	38	106	83	17	54	34	25	19	25	425
PSH	0	18	20	42	32	36	33	35	17	32	265
OLA	0	0	0	0	0	0	0	0	0	0	0
Kabwir	0	0	7	3	2	0	1	20	16	1	50
Mangu	0	0	0	2	0	2	0	1	0	0	5
Pankshin	0	0	0	0	0	0	0	0	0	0	0
Langtang	13	12	13	12	8	10	11	12	16	16	123
Tunkus PHC	0	0	0	0	0	1	3	6	3	3	16
Mikang	0	0	0	0	0	0	0	0	0	0	0
Total	37	68	146	142	59	103	82	99	71	71	884

VCH = Vom Christian Hospital

PSH = Plateau Specialist Hospital

OLA = Our Lady of Apostle Hospital

PHC = Primary Health Care

Table 2: Monthly distributions of dog bite cases in Plateau State, Nigeria Jan. 2007- Dec. 2016

Month/ Hospital	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
VCH	28	41	32	37	33	44	29	50	35	38	27	32	425
PSH	14	22	37	28	34	35	15	11	11	26	22	20	265
OLA	0	0	0	0	0	0	0	0	0	0	0	0	0
Kabwir	1	3	1	3	4	3	1	6	4	8	10	6	50
Mangu	1	0	2	1	0	1	0	0	0	0	0	0	5
Pankshin	0	0	0	0	0	0	0	0	0	0	0	0	0
Langtang	7	13	8	15	10	7	9	12	12	8	9	13	123
Tunkus PHC	0	2	2	1	3	0	2	0	2	1	0	3	16
Mikang	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	51	81	82	85	84	80	56	79	64	81	68	73	884

VCH = Vom Christian Hospital

PSH = Plateau Specialist Hospital

OLA = Our Lady of Apostle Hospital

PHC = Primary Health Care

with only a marginal difference of 6.78% for the study period. There was no statistically significant relationship between the date and the sex of the victims, calculated P-value (0.492) is greater than 0.05 (Table 3).

Age distribution of dog bite cases showed that there were more adult (53.51%) victims of dog bite than children (46.49%) below 15 years of age. There was no statistically significant ($p < 0.05$) relationship between the date and the age of the victims, calculated P-value (0.065) is greater than 0.05 (Table 4).

Location of dog bite sites on the part of the body of the victims indicated that no proper record on the location of dog bite was kept; hence, "unknown" (58.71%) bite location was the highest. This was

followed by the leg (26.81%) and the least was the abdomen (0.79%) of the victims. There was statistically significant relationship between the date and the location of the bite on the victims, calculated P-value (0.004) is less than 0.05 (Table 5).

Discussion

The results of this study revealed that 884 dog bite cases were reported to nine health facilities in Plateau State over the ten-year period which calls for concern due to its public health significance. This is quite disturbing when compared to 223 dog bite cases reported to 11 hospitals in Niger State over eight-year period (Garba *et al.*, 2014). The presence of two popular dog markets in the state located in Jos South and Kanke Local Government Areas (LGA)

Table 3: Sex distribution of victims of dog bite cases in Plateau State, Nigeria Jan. 2007- Dec. 2016

Year/Sex	Male (%)	Female (%)	Total (%)	P-value	Chi square
2007	20 (2.26)	17 (1.92)	37 (4.19)	0.49	8.42
2008	41 (4.63)	27 (3.05)	68 (7.69)		
2009	66 (7.47)	80 (9.05)	146 (16.52)		
2010	79 (8.94)	63 (7.13)	142 (16.06)		
2011	32 (3.62)	27 (3.05)	59 (6.67)		
2012	59 (6.67)	44 (4.98)	103 (11.65)		
2013	44 (4.98)	38 (4.30)	82 (9.28)		
2014	48 (5.43)	51 (5.77)	99 (11.20)		
2015	37 (4.19)	34 (3.85)	71 (8.03)		
2016	46 (5.20)	31 (3.51)	77 (8.71)		
Total	472 (53.39)	412 (46.61)	884 (100)		

Table 4: Age distribution of victims of dog bite cases in Plateau State, Nigeria Jan. 2007- Dec. 2016

Year/Age	> 15 years (%)	< 15 years (%)	Total (%)	P-Value	Chi square
2007	22 (2.49)	15 (1.70)	37 (4.19)	0.07	38.88
2008	48 (5.43)	20 (2.26)	68 (7.69)		
2009	77 (8.71)	69 (7.81)	146 (16.52)		
2010	82 (9.28)	60 (6.79)	142 (16.06)		
2011	29 (3.28)	30 (3.93)	59 (6.67)		
2012	52 (5.88)	51 (5.77)	103 (11.65)		
2013	46 (5.20)	36 (4.07)	82 (9.28)		
2014	50 (5.66)	49 (5.54)	99 (11.20)		
2015	35 (3.96)	36 (4.07)	71 (8.03)		
2016	32 (3.62)	5 (0.57)	77 (8.71)		
Total	473 (53.51)	411 (46.49)	884(100)		

Table 5: Site of bite of dog bites on victims in Plateau State, Nigeria Jan. 2007- Dec. 2016

Year/Site of bite	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total (%)
Head	0	0	2	1	2	1	0	2	1	0	9(1.02)
Hand	4	7	12	7	2	11	12	9	11	2	77(8.71)
Abdomen	1	0	0	1	1	1	0	1	1	1	7(0.79)
Buttocks	0	3	2	4	1	5	3	1	0	3	22(2.49)
Leg	23	16	33	30	13	21	24	27	23	27	237(26.81)
Multiple	2	1	3	2	0	2	1	0	1	1	13(1.47)
Unknown	7	41	94	97	40	62	42	59	34	43	519(58.71)
Total	37	68	146	142	59	103	82	99	71	77	884(100)

P-Value 0.004* (P < 0.05)

Chi square 85.36

(Sabo *et al.*, 2008; Konzing *et al.*, 2015) could have played a role in the high incidence of dog bite cases reported in this study. There was no vaccination of dogs against rabies at the dog markets and no veterinary worker was present at the markets to the best of our knowledge. In the year 2007, only 37 cases were recorded, but the incidences of dog bite cases increased significantly in 2009 and 2010 to 146 cases and 142 cases, respectively.

Increase in awareness on the dangers of rabies could have prompted most of the victims to report cases of dog bites to the hospitals in order to receive human anti-rabies post exposure prophylaxis vaccine, which is in agreement with the observation of Garba *et al.* (2014).

Furthermore, results from this study indicated that Vom Christian Hospital (VCH) had the highest number of cases (425 cases) recorded which

represents 48% of 884 dog bite cases reported followed by 265 dog bite cases (30%) from Plateau State Specialist Hospital (PSH). The two hospitals are both located in Jos South Local Government Area (LGA), thereby making the findings consistent with the reports of Kujul *et al.* (2012) who reported that Jos south had the highest number of dog bite cases. VCH is located more in the rural community which is on the outskirts of Jos metropolis which further confirms the fact that 92% of dog population in Nigeria are in the rural settlements (RIM, 1992). Also, the constant availability of human anti-rabies post-exposure prophylaxis vaccine was another factor responsible for the high number of dog bite victims recorded by VCH.

The highest number of dog bite cases (85 cases) reported to the hospitals was in April. This is in agreement with the work of Garba *et al.* (2014) in Niger State of Nigeria. High incidence of dog bite (81 cases) was also reported in October which is similar to the findings of Otolorin *et al.* (2014) in Abia State of Nigeria where there is increased frequency of dog bites between the months of October and December that coincides with festive activities. Moreover, the breeding period for dogs falls within October to December of the dry season (Garba *et al.*, 2005). This study also revealed that there were 472 (53.39%) male victims of dog bites, as against 412 (46.61%) females. This is similar to the reports of Aghahowa & Ogbeveon (2010) and Otolorin *et al.* (2014). In the African tradition, men are expected to provide for the daily needs of their families; in the attempt to meet these needs they may fall victims of dog bite (Otolorin *et al.*, 2014).

Based on the age distribution of dog bite, there were more adults above 15 years of age (53.51%) being victims of dog bite than children below 15 years of age. This agrees with the studies of Sabo (2009); Garba *et al.* (2014) and Konzing *et al.* (2015) that more dog bite cases were reported in adults, but contrary to the study that children had more dog bite cases (Abubakar & Bakari, 2012).

The site of dog bite not documented, was recorded as unknown in 58.71% of the cases. This may be an indication that proper records were not kept by some of the selected hospitals. If proper records were kept by all the hospitals, the result could have been in agreement with the results obtained in Niger State that 81% of the victims were bitten on the leg (Garba *et al.*, 2014) and the findings in Abia State that the leg had the highest number of bites than other parts of the body (Otolorin *et al.*, 2014).

It can be concluded from this study that there was a high incidence of dog bites in Plateau State for the period of the study. The presence of two popular dog markets located in Jos south and Kanke Local Government Areas of the state could possibly have played a significant role in the high incidences of dog bite cases recorded in this study. There is a tendency of some of the dogs escaping from the dog market to become a source of transmission of rabies to other dogs and the public. Available records have shown that some people get attracted to the dogs which they buy and take home as guard dogs without knowing the vaccination status of the dogs, thereby contributing to the high dog bite cases reported in Plateau State.

Hospitals in Plateau State should endeavour to improve on their record keeping on reported dog bite cases as this will help health workers in planning of rabies control programmes in the state.

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Conflicts of Interest

The authors declare they have no conflict of interest.

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