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## **Cases of Dog Bite in Aba, Abia State Nigeria and Its Public Health Significance**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors OGR and UJU designed the study, performed the statistical analysis. Authors OGR and DAA wrote the protocol and the first draft of the manuscript, managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.*

**Original Research Article**

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### **ABSTRACT**

**Background:** Dog bite cases poses a major public health threat in Nigeria. Majority of rabies infection in humans are due to bites from rabid dogs which are mainly local breed. Research carried out in Nigeria has established that some apparently healthy dogs excrete rabies viral antigen in their saliva without showing clinical signs.

**Aim:** This study was carried out to evaluate cases of dog bite in Aba, Abia state Nigeria and its public health significance

**Methodology:** Cases of dog bite in humans reported at the Zonal Veterinary Clinic Aba, Abia state Nigeria from 2007 to 2012 were retrieved. Data on cases of dog bites from the Veterinary clinic record were extracted using a structured questionnaire designed for the study.

**Results:** Out of 215 reported cases of dog bite, 11.6% were victims less than 15 years of age and 44.7% were victims greater than 30 years of age. Local breed of dogs (50.7%) were most involved in the bites, with cross breed (12.6%) being the least. Majority (78.1%) of the dogs involved in the bites were unvaccinated against rabies, with 11.6% having unknown anti-rabies vaccination status. There was no association ( $\chi^2 = 7.38$ ,  $P > 0.05$ ) between breed and vaccination status of the offending dogs. Dog bite victims were

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more of males (62.8%) than females (37.2%) with seasonal index showing the greatest values between the months of October to December. Most of the bites (63.7%) occurred around the lower extremities with bites around the abdominal region (2.8%) being the least.

**Conclusion:** Reports of dog bite cases in humans indicate the need for public health enlightenment campaign programs aimed at educating the public on the need to seek proper post-exposure prophylaxis treatment from health care facilities when bitten by dogs and the need for dog owners to vaccinate their dogs yearly against rabies.

*Keywords: Dog bite; rabies; Aba; seasonal index.*

## **1. INTRODUCTION**

Rabies is an acute, central nervous system infection, characterized by central nervous system irritation, followed by paralysis and death [1]. It is a fatal viral disease that affects all warm blooded vertebrates [2]. In most African countries dogs have been shown to be the principal reservoir and primary source of human exposure to rabies [3]. Dog bite poses a major public health threat mostly in developing nations [4]. Human fatalities associated with rabies occur in people who fail to seek medical assistance usually because they are unaware of their exposure, lack access to treatment or have no resources for the treatment [5]. In some communities in Nigeria most dog bites victims tend to employ traditional means of treatment which are grossly inadequate hence putting them at risk.

Local breed of dogs have been implicated in most dog bite cases, Istifanus [6] reported that out of the 132 cases of dog bite reported at the Ahmadu Bello University Health Centre Zaria, Nigeria, 81.8% of the dogs involved in the bites were local breed. About 99% of rabies infections worldwide have been attributed to bites from rabies infected dogs. A 5% prevalence of rabies antigen in the saliva and brains of apparently healthy dogs sold for human consumption in Abia State was reported by Mshelbwala et al. [7], some of these dogs are sourced locally from the surrounding locality hence signifying that dog bites are of public health concern.

The annual number of human rabies deaths globally as at 2010 was estimated to be between 26,400 to 61,000 and vast majority of these deaths (84%) occur in rural areas [8]. Rabies post exposure prophylaxis if given promptly to exposed humans is highly effective, and it includes: wound cleansing, immunization with a human rabies modern cell culture vaccine, and administration of human rabies immunoglobulin (HRIG) [9]. In some African countries where modern cell culture rabies vaccines are unavailable, nerve tissue rabies vaccines are giving to dog bite victims as post-exposure prophylaxis treatment. Nerve tissue rabies vaccine remains widespread in Ethiopia and is still in production in Algeria, but the use and production of the vaccine in some other countries in North Africa and in the horn of Africa is unknown [8]. These vaccines type are more reactogenic as compared to modern cell culture vaccines and may cause severe reactions when used in humans. This study was carried out to evaluate cases of dog bite in Aba, Abia state Nigeria and its public health significance.

## **2. MATERIALS AND METHODS**

### **2.1 Study Area**

The study was carried out in Aba, Abia state, located in South Eastern Nigeria. Aba is a major urban settlement and commercial centre in Nigeria. Aba is an industrial zone and lies between latitudes 5°07'N and longitude 7°22'E. Aba is densely populated (The human population of Aba is estimated at 531,340 according to the 2006 population census). With a temperature of about 21°C, the climate is humid tropical type and is characterized by wet and dry seasons [10].

### **2.2 Information on Cases of Dog Bites in Humans**

An observational retrospective study was carried out on cases of dog bite reported at the Zonal Veterinary Clinic Aba, Abia state Nigeria from 2007 to 2012. A structured questionnaire was designed and all the 215 cases of dog bite reported between 2007 to 2012 were entered in separate questionnaire containing two sections. Section A: included the victims information like Age, sex, monthly variation of dog bite cases to determine the seasonal index and site of bite while Section B: Included offending dog information like breed and vaccination status. Seasonal index of reported dog bite cases was calculated using moving average and ratio. Data generated was analysed using the statistical packages for social sciences (SPSS) Version 17. Test for statistical association between the breed and vaccination status of offending dogs was analysed. Data obtained were presented using tables and charts.

## **3. RESULTS**

### **3.1 Distribution of Dog Bites in Humans by Age and Sex Obtained at the Zonal Veterinary Clinic Aba, Abia from 2007–2012**

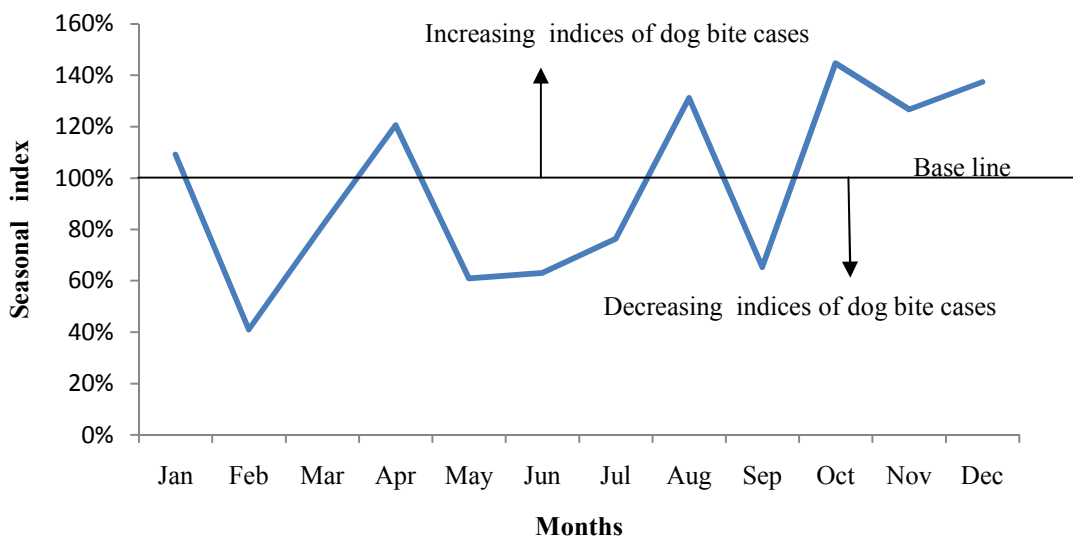
Out of 215 reported cases of dog bite, 25(11.6%) were victims less than 15 years of age, 94(43.7%) and 96 (44.7%) were victims between 15-30 years and greater than 30 years of age respectively (Table 1). Dog bite victims were more of males 135/215 (62.8%) than females 80/215(37.2%) (Table 2). Time series decomposition using ratio to moving average revealed seasonal fluctuations (Fig. 1). Seasonal changes expressed as seasonal index showed the greatest values between the months October to December. The lowest indices were observed in February.

**Table 1. Distribution by age of humans bitten by dogs obtained from the Zonal veterinary clinic Aba, Abia from 2007–2012**

<b>Year</b>	<b>Age (years)</b>		
	<b>&lt;15 (%)</b>	<b>&gt;15- 30 (%)</b>	<b>&gt;30</b>
<b>S/N</b>			
2007	4(12.5)	14(43.8)	14(43.8)
2008	5(8.9)	35(62.5)	16(28.6)
2009	8(18.2)	17(38.6)	19(43.2)
2010	2(10.5)	7(36.8)	10(52.6)
2011	5(13.2)	11(28.9)	22(57.9)
2012	1(3.8)	10(38.5)	25(57.7)
<b>Total</b>	<b>25(11.6)</b>	<b>94(43.7)</b>	<b>96(44.7)</b>

**Table 2. Distribution by sex of humans bitten by dogs obtained from the Zonal veterinary clinic Aba, Abia state from 2007–2012**

Year	Sex	
S/N	Male (%)	Female (%)
2007	20(62.5)	12(37.5)
2008	30(53.6)	26(46.4)
2009	26(59.1)	18(40.9)
2010	16(84.2)	3(15.8)
2011	20(52.6)	18(47.4)
2012	23(88.5)	3(11.5)
Total	135(62.8)	80(37.2)



**Fig. 1. Seasonal index of monthly dog bite cases covering the period from 2007–2012 obtained from Zonal veterinary clinic Aba, Abia state**

**3.2 Breeds And Vaccination Status Specific Rates of Offending Dogs Involved in Bite Cases and Distribution of Dog Bites by Anatomical Location on Humans Obtained from the Zonal Veterinary Clinic Aba, Abia from 2007–2012**

Local breed of dogs 109/215 (50.7%) were most involved in reported cases of dog bite in humans at the clinic, followed by Exotic breed 79/215(36.7%) with Cross breed 27/215(12.6%) being the least. Also 168/215(78.1%) of the dogs involved in the bites were unvaccinated against rabies (Table 3). Most of the dog bites 137/215(63.7%) occurred on the leg, followed by bites on the hands 55/215(25.6%), with bites on the abdomen being the least 6/215(2.8%). Most of the dog bites on the leg, hand, back and abdomen occurred in individual greater than 15 years old (Table 4).

**Table 3. Breeds and vaccination status specific rates of offending dogs involved in bite cases reported at the Zonal veterinary clinic Aba, Abia from 2007–2012**

Variable	Breed of dogs			Total
	Exotic (%)	Local (%)	Cross (%)	
	n=215			
Breed specific rates(%)	79(36.7)	109(50.7)	27(12.6)	
Vaccination status specific rates (%)				
	n = 79	n=109	n=27	
unvaccinated	60(75.9)	90(82.6)	18(66.7)	168(78.1)
vaccinated	10(12.6)	10(9.2)	2(7.4)	22(10.2)
unknown	9(11.4)	9(8.3)	7(25.9)	25(11.6)

*P-value=0.117,  $\chi^2=7.377$*

**Table 4. Location of dog bite by age of victims specific rates obtained from the Zonal veterinary clinic Aba, Abia State 2007–2012**

Location of bite	Age of victims (years)		
	<15 (%)	15-30 (%)	>30 (%)
Leg (n=137)	16(11.7)	60(43.8)	61(44.5)
Hand (n=55)	6(10.9)	25(45.5)	24(43.6)
Back (n =17)	2(11.8)	7(41.2)	8(47.1)
Abdomen (n=6)	1(16.7)	3(50)	2(33.3)
Total (n= 215)	25(11.6)	95(44.2)	95(44.2)

#### 4. DISCUSSION

Cases of dog bite in humans reported to the Zonal Veterinary Clinic Aba , Abia state Nigeria is just a few number of cases out of the many that occurs within the study area, as many cases are not reported to the relevant health care authorities or are treated traditionally, hence some dog bite victims do not receive adequate post-exposure prophylactic treatment. The reported detection of rabies antigen found in the saliva of relatively healthy dog slaughtered for human consumption in Abia state in a recent study [7] has highlighted the public health risk of dog bites in the study area. Local breed of dogs were more involved in cases reported probably because most of the reported dog bite cases were from individuals living in the adjoining town close to the main city, where the proportion of local breed of dogs were high and were there is little or no restriction in dog movement. Also majority of the dogs involved in the bites were unvaccinated or had unknown anti-rabies vaccination status posing serious public health concerns. Such local breed of dogs have less chances of being vaccinated as compared to exotic breeds of dogs due to low value place on them, in addition veterinary clinics are not evenly spread across the study area where dog owners can easily take their dogs for routine anti-rabies vaccination. In addition poor awareness on the part of dog owners to vaccinate their dogs yearly against rabies is also a major challenge in the prevention of rabies among dog population.

Frequency of dog bites were predominant between the months of October to December this coincides which the dry season that fall within the breeding period of most dogs. Within this period, there is an increase in dog movement for the purpose of mating encouraging straying in dogs and human exposure to dog bite. Most of the dog bites occurred around the lower

limbs in agreement with Ojuawo [11] who reported the lower limbs as the commonest site of dog bite.

Reported cases of dog bites were more in males, this is consistent with result gotten in other parts of Nigeria [12-14]. Also most of the bites occurred in adults contrary to some studies were cases of dog bite were more in children [15,16]. This may probably be attributed to male adults being more enterprising and adventurous in their quest to meet up with their needs and the needs of their families and are therefore more exposed to bites as they move from one location to the other within the city transacting one form of business or the other.

## 5. CONCLUSION AND RECOMMENDATION

Dog bites cases in humans in the study area occur more in males and adults with local breed of dogs being mostly involved in reported cases. Majority of the dogs involved in the bites were unvaccinated against rabies, and most of the reported cases occurred between the months of October to December.

There is need for proper record keeping at the Zonal Veterinary Clinic Aba in order to have adequate documentation of vital information of dog bite victims and that of the offending dogs. These records will serve as relevant data for public health workers during planning of rabies control programs. Dog owners should be encouraged to vaccinate their dogs regularly against rabies and ensure they restrict their dogs' movement. In addition there should be increased public health enlightenment campaign on the need for dog-bite victims to seek adequate medical attention from health care facilities and human anti-rabies vaccine should be provided at an affordable price in all health care centres across the city.

## CONSENT

Not applicable.

## ETHICAL APPROVAL

Not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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