

Access this article online	
Quick Response Code:	Website: www.annalsafmed.org
	DOI: 10.4103/1596-3519.93534

Incidence of dog bite injuries and clinical rabies in a tertiary health care institution: A 10-year retrospective study

S. A. Abubakar, A. G. Bakari

Department of Medicine, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria

Correspondence to: Dr. S. A. Abubakar, Department of Medicine, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria. E-mail: abbatta1@yahoo.com

Abstract

Background: It is widely recognized that rabies is grossly under-reported even though it is a notifiable disease and a lack of accurate figures has rendered rabies a low public health and veterinary priority. This study aimed at determining the incidence of dog bite injuries and clinical rabies in a tertiary health care centre.

Materials and Methods: Case records of patients managed at the accident and emergency unit of Ahmadu Bello University Teaching Hospital, Zaria, between June 2000 and May 2010 with diagnosis of dog bite and rabies were retrieved. Relevant clinical data were extracted using a structured questionnaire designed for the study.

Results: Eighty-one persons out of 24,683 consultations in the accident and emergency unit presented with dog bite injuries with two clinical cases of human rabies. Mean age of victims of dog bite injuries was 21.1 ± 14.3 years and the majority (55.6%) were children. Males were more affected than females with a male:female ratio of 4.8:1, lower limb/buttock injuries were significantly higher in children than adults, but the adults sustained significantly more severe (type III) injury. The majority of dog bite injuries were washed with soap and irrigated with water or saline and 87.7% of the victim of dog bite received postexposure anti-rabies vaccine.

Conclusion: Hospital incidence of dog bite injuries was low, but the use of postexposure prophylaxis was high.

Keywords: Dog bite, incidence, prophylaxis, rabies

Résumé

Fond: Il est largement reconnu que la rage est exagérément sous-déclarée même si c'est une maladie à déclaration obligatoire et l'absence de chiffres précis a rendu la rage un peu la santé publique et la priorité vétérinaire. Cette étude visant à déterminer l'incidence des blessures de morsure de chien et de rage clinique dans un centre de soins de santé tertiaires.

Des matériaux et des procédés: Des dossiers de patients gérés à l'accident et l'unité d'urgence d'Ahmadou Bello University Teaching Hospital, Zaria, entre juin 2000 et mai 2010 avec diagnostic de morsure de chien et la rage ont été récupérées. Les données cliniques pertinentes ont été extraites à l'aide d'un questionnaire structuré, conçu pour l'étude.

Résultats: Quarante-vingt-un personnes hors de 24 683 consultations dans l'accident et l'unité d'urgence présenté avec des blessures de morsure de chien avec deux cas cliniques de rage humaine. Moyen âge des victimes de blessures de morsure de chien était $21.1 \pm 14,3$ ans et la majorité (55,6%) étaient des enfants. Les hommes étaient plus touchés que les femmes avec un rapport de l'homme : la femme de 4.8:1, basses limb/fesse blessures étaient significativement plus élevées chez les enfants que les adultes, mais les adultes blessé significativement plus sévère (type III). La majorité des blessures de morsure de chien ont été lavée avec du savon et irriguée avec de l'eau ou une solution saline et 87,7% de la victime d'une morsure de chien a reçu une vaccin antirabique post-exposition.

Conclusion: Incidence de l'hôpital de blessures de morsure de chien était faible, mais l'utilisation d'une prophylaxie était haute.

Mots clés: Morsure de chien, incidence, prophylaxie contre la rage

Introduction

Rabies is an acute viral disease of the central nervous system that remains untreatable.^[1] Rabies is caused by Rhabdoviridae family and genus lyssavirus,^[2] usually transmitted by the bite of an infected animal or contamination of broken skin by saliva of an infected animal.^[3] An effective rabies vaccine was developed over a century ago making rabies a preventable disease. Human diploid cell vaccine in combination with rabies immune globulin when administered promptly to rabies-exposed patients following appropriate wound care is virtually 100% effective in preventing human death.^[4] Although rabies can infect and be maintained by several different host species, domestic dogs are by far the most important source of infection to humans with more than 95% of human cases caused by bite from rabid dogs.^[5] Canine vaccination has virtually resulted in eradication of human rabies in USA, even though dog bite is still an important source of injuries.^[6] Human rabies is by no means rare in Nigeria; a decade of experience in two hospitals in Sokoto,^[7] north-western Nigeria documented 16 cases of rabies and over 900 victims of dog bite injuries but finding in the southern part of Nigeria documented much fewer cases over a 12-year period.^[8] This study aims to determine the incidence of dog bite injuries and clinical rabies in Ahmadu Bello University Teaching Hospital, Zaria, between June 2000 and May 2010 and to determine the frequency of the use of postexposure anti-rabies prophylaxis (PEP). This study will add to the existing body of literature available on rabies in Nigeria and by so doing we can recommend strategies to improve patients' care afflicted with dog bite injuries and rabies.

Materials and Methods

We conducted an observational retrospective study on clinical data of patients managed with diagnosis of dog bite injuries and rabies at the accident and emergency unit of ABUTH, Zaria, between June 2000 and May 2010. A questionnaire was designed to extract relevant clinical data from the case records. The questionnaire recorded age, sex of the victims, site of the bite, and the immunization status of the dogs. Wound care and use of pre- and postexposure anti-rabies vaccine in the victims were also noted. The month of the bite was also recorded and whether the bite was provoked, wound severity was graded as follows, 0 = no apparent injury seen, 1 = skin scratch with no bleeding, 2 = minor wound with some bleeding, 3 = deep or multiple injury.^[9] The diagnosis of dog bite and rabies was clinical, in no case was postmortem brain examination and/or serological confirmation done.

Statistical analysis

Data analysis was performed using Epi-info 2005. Frequency, mean, and standard deviations were generated. Continuous variables were compared using Student's *t*-test. A *P* value of <0.05 was statistically significant.

Results

Eighty-one victims out of 24,683 consultations reported at the accident and emergency unit of ABUTH, Zaria, between June 2000 and May 2010 following dog bite injuries. This constituted 0.3% of total attendance at the accident and emergency unit of the hospital. The majority, 45 (55.6%), were children less than 18 years while 36 (44.4%) were adults. The victims were predominately males, with a M:F ratio of 4.8:1. Prevalence of dog bite was highest, 41 (50.6%), during the hot season (April–June) and low, 14 (17.3%), during the wet season (July–October). None of the victims was previously immunized against rabies. The mean age was 21.1 ± 14.3 years with a range of 2–48 years. Males were significantly more affected than females across all the groups. Individuals aged 1–10 years were most affected as shown in Table 1.

Of the 81 cases of dog bite, the owners of the dogs were known in 39 (48.1%), and 12 (30.8%) of dog owners claimed that their dogs were properly vaccinated, though none came to the clinic with proof of vaccination of the dogs. Interestingly, 12 (14.8%) of the victims were actually bitten by their own dogs [Table 2].

Sixty-two (76.5%) received wound care following dog bite. Wounds were washed with soap and irrigated with water or saline in only 32 (51.6%). All the victims received prophylaxis against tetanus.

PEP was received in 71 (87.7%), and the immunization schedule was completed in 49 (79.0%) though prescription was inappropriate in 10 (14.4%). Rabies immune globulin was prescribed in 15 (18.5%) and 7 (8.6%) of the victims received the treatment.

Table 1: Age and sex distribution of victims of dog bite in ABUTH, Zaria (2000–2010)

Age group (years)	Males	Females	Total
1–10	19	6	25
11–20	20	4	24
21–30	9	0	9
31–40	7	4	11
>41	12	0	12

Table 2: Distribution of victims of dog bites injuries according to the anatomical site of bite and grade of severity of injury

Anatomical site of bite	Grades of I	Severity of II	Injury III	Total
Head/neck	0	0	2	2
Upper limb	17	8	10	35
Trunk/buttock	4	4	0	8
Lower limb	10	13	4	27

$\chi^2 = 20.6023$, $df = 8$, $P = 0.0083$.

Page | 110

Two cases of clinical rabies were seen during the study period, the case record of one could not be traced. The patient's age was 40 years, a farmer from Dawa village, a sub-urban community, in the Kaduna state. The incubation period was 2 weeks and site of bite was right forearm. The source of bite was a stray dog that had bitten two other people including a goat. Significant clinical features at presentation were aggression, restlessness, and hydrophobia. Treatment received included parenteral hydration, sedation, anti-inflammatory medication, and HDCV. The dog was killed and buried by the community but brain was not brought for histopathological examination. The patient died within 12 h of hospitalization.

Table 3 shows that more severe injuries occur more in adults than in children and children presented much earlier than adults.

Discussion

Dog bite injuries were observed to be one of the uncommon emergencies seen at the centre as it constituted <1% of total attendance at the accident and emergency unit. Children constituted a vast majority (55%) of the victims and particularly those less than 10 years. Reports from other studies in Nigeria^[7,8] and USA^[10] found children to be more vulnerable to dog bite injuries, probably because children are more likely to have the dogs provoked. Children are also less likely to defend themselves thereby sustaining multiple injuries. Lower limb/buttocks injuries occurred mainly in children while upper limbs and head and neck injuries occurred chiefly in adults. This could be explained probably by the fact that children have tendencies to run resulting in bite at the back while adults could stand to defend themselves. Our report is not in agreement with the findings in some studies that reported head and neck injuries occurring mainly in children.^[7,9] The male:female ratio showed male preponderance, which could be explained by the day and night activities; males are frequently involved in and females are more likely to remain in-doors for cultural and religious reasons. This is similar to

Table 3: Baseline characteristic of victims of dog bite stratified by the age category

Characteristics	Children (N = 45)	Adults (N = 36)	P value
Mean age	10.04 ± 4.5	34.9 ± 9.4	$T = 15.96$, $P < 0.0001$
Age range	2–18	19–48	N/A
Male:female ratio	3.5:1	8:1	N/A
Type of injury:			
I	24 (53.3%)	15 (41.7%)	$P = 0.53$
II	21 (46.7%)	5 (13.9)	$P = 0.02$
III	0 (0%)	16 (44.4%)	$P < 0.0001$
Site of bite:			
Head/neck	0 (0%)	2 (5.5%)	$P = 0.2$
Lower limb	23 (51.1%)	5 (13.9)	$P = 0.02$
Multiple injury	5 (11.1%)	3 (8.3%)	$P = 1.0$
Trunk/buttocks	8 (17.8%)	0 (0%)	$P = 0.02$
Upper limb	9 (20%)	26 (72.2%)	$P = 0.006$
Duration of time prior to presentation (HRS)	2.7	10.7	$T = 4.6$, $P < 0.0001$

the findings in Sokoto^[7] and other parts of Africa^[10] where boys were more affected than girls. The majority (51.9%) of the bites was by stray dogs, as most people in this part of the world do not chain their dogs and the dogs wander aimlessly posing danger to their neighbours and strangers. Interestingly some (14.8%) of the victims were bitten by their own dogs, could it be that dogs were rabid or hungry? The immunization status of the dogs was regrettably low in this study, when mass vaccination of domestic dogs has successfully eliminated or controlled domestic dog rabies in many parts of the world.^[11,12] Postexposure anti-rabies vaccine in combination with human rabies immune globulin administered soon after bite by suspected rabid dogs have been found to be very effective in controlling human rabies.^[4] The recommended postexposure prophylaxis is intramuscular administration of human diploid cell vaccine into the deltoid on days 0, 3, 7, 14, and 28. Injections can be given into anterolateral thigh for children.^[13] More than one-half (60.5%) of the victims of bite injuries in this study completed the recommended postexposure prophylaxis regimen, but <1% of the vaccine-treated persons received human rabies immune globulin. This is in concordance with reports in other studies^[10] where 65% of rabies-exposed persons received postexposure prophylaxis. The use of human rabies immune globulin was quite low among vaccine-treated persons, though similar to findings in some^[10,14] studies. This could probably be that human RIG is prohibitively expensive or unavailability in the hospital. Most (87.7%) of the victims afflicted with dog bite injuries presented within 24 h of the bite which is quite commendable. The limitation of this study is its retrospective design.

In conclusion this study has shown that dog bite injuries though an uncommon presentation in our tertiary health care centre, the possibility of rabies has not been eradicated. It is thus recommended that individuals at the risk of rabies should have routine pre- and postexposure anti-rabies vaccination. All victims of dog bite injuries suspected to be rabid should be encouraged to receive complete postexposure prophylaxis and human rabies immune globulin. Human diploid cell vaccine together with human rabies immune globulin should be made available and affordable in our hospitals.

References

1. Warrell MJ, Warrell DA. Rabies and other lyssavirus disease. *Lancet* 2004;363:959-69.
2. Rupprecht CE, Hanlon CA, Hemachudha T. Rabies re-examined. *Lancet Infect Dis* 2002;2:327-43.
3. Sweetman SC, Blake PS, McGlashan GC, Neathercoat GC, Parsons AV, Brafield A, *et al.* Vaccine immunoglobulins and anti-sera. In: The complete drug reference. Vol 1. London, UK: Pharmaceutical Press; 2007. p. 2029-30.
4. Quiambao BP, Dimaano EM, Ambasc C, Davis R, Banzhoff A, Malerczyk C. Reducing the cost of post-exposure rabies prophylaxis: Efficacy of 0.1ml PCEC rabies vaccine administered intradermally using the Thai red cross post-exposure regimen in patients severely exposed to laboratory confirmed rabid animal. *Vaccine* 2005;23:1709-14.
5. World health Organization. World survey of rabies No 34 for the year 1998 WHO/CDS/CSR/APH/99.6 World Health Organization, Geneva, Switzerland, 1999.
6. Vaidya S, Manning SE, Dhankhar P, Meltzer M, Rupprecht C, Hull HF, *et al.* Estimating the risk of rabies transmission to humans in USA: A Delphi analysis. *BMC Public Health* 2010;10:278.
7. Ahmed H, Chafe UM, Magaji AA, Abdul-Qadir A. Rabies and dog bite in children: A decade of experience in Sokoto Nigeria. *Sokoto J Vet Sci* 2000;1:2-10.
8. Aghahowa SE, Ogbervo RN. Incidence of dog bite and anti-rabies vaccine utilization in the University of Benin Teaching Hospital, Benin city, Nigeria: 12-year assessment. *Vaccine* 2010;28:4847-50.
9. Kureishi A, Xu LZ, Wu H, Stiver HG. Rabies in china: Recommendations for control. *Bull World Health Organ* 1992;70:443-50.
10. Hampson K, Dobson A, Kaare M, Dushoff J, Magoto M, Sindoya E, *et al.* Rabies exposures, post-exposure prophylaxis and deaths in a region of endemic canine rabies. *PLoS Negl Trop Dis* 2008;2:e339.
11. Hampson K, Dushoff J, Bingham J, Brückner G, Ali YH, Dobson A. Synchronous cycles of domestic dogs rabies in sub-Saharan Africa and the impact of control efforts. *Proc Natl Acad Sci U S A* 2007;104:7717-22.
12. WHO. Expert consultation on rabies first report. Geneva: WHO; 2004.
13. Waren MJ. Rabies encephalitis and its prophylaxis. *Pract Neurol* 2001;1:14-29.
14. WHO. World survey of rabies no 34 for the year 1998. WHO/CDS/CSR/APH/99.6,1999.

Cite this article as: Abubakar SA, Bakari AG. Incidence of dog bite injuries and clinical rabies in a tertiary health care institution: A 10-year retrospective study. *Ann Afr Med* 2012;11:108-11.

Source of Support: Nil, **Conflict of Interest:** None declared.