

Human rabies: Still a neglected preventable disease in Nigeria

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Abstract

Background/Objectives: Adequate surveillance and monitoring of dog bite incidents are veritable tools in the determination of the epidemiology of human rabies infections. There is a paucity of data with regards to rabies in Nigeria. Hence, this study was aimed at describing the pattern and outcomes of dog bites and rabies infections among patients presenting to University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu.

Subjects and Methods: This was a 10-year (January 1, 2004 to December 31, 2013) observational retrospective study. Case definition of rabies was based on ICD₁₀ criteria, while relevant clinical data were retrieved from individual folders of registered victims using a semi-structured questionnaire. Data were analyzed using SPSS version 17.0 while the level of statistical significance was set at $P < 0.05$.

Results: A total of 149 cases of dog bites were reported during the period under review, of which 6 (4.0%) had confirmed rabies. Ninety-six (64.4%) cases presented more than 24 h after the bites. Majority of the offending dogs were stray dogs 86 (57.7%), which attacked their victims unprovoked, in 54.6% of cases. Furthermore, most of the bites were from dogs with unknown history of rabies vaccination 72 (52.3%), while the case fatality rate was 100%.

Conclusions: All the cases of rabies reported were as a result of bites from stray dogs with unknown history of rabies vaccinations, and the outcome was 100% fatality in all cases. Efforts should be made to create and strengthen awareness campaigns on control of rabies infections through responsible dog ownership including their regular vaccinations as well as provision and use of prompt postexposure prophylaxis in human cases of dog bites at all levels of health care.

Key words: Dog bites, Nigeria, pattern, rabies

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Introduction

Rabies is an age long vaccine-preventable infection but still accounts for over 55,000 deaths per annum globally with more than 99% of cases occurring in the developing countries of Asia and Africa.^[1,2] Dog bites are the main sources of rabies infections in humans especially in the developing countries,^[3] and rabies had remained as a neglected tropical disease till date. Surveillance reports have shown that more than 3.3 billion people by way of

residence in regions where rabies is enzootic are at risk of rabies.^[4]

Of concern also is that 40% of dog bites victims are children under 15 years of age who may not report minor scratches of dog bites to their caregivers and in cases where the offending dog is rabid the possibility of rabies infection resulting increases.^[1,5] Dog bites in humans are of public

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health importance globally, as 35–50% of victims of rabid dog bites may contract rabies if adequate and timely pre and/or postexposure prophylaxes are not applied.^[3]

Majority of the cases of dog bites in our environment are from stray dogs. Recent reports have pointed to rising stray dog population in developing countries. This rising stray dog population results from poor dog ownership where dogs belonging to individuals and/or families are left uncared for, or with partial restriction and without adequate vaccinations due to weak or ineffective legislations on responsible dog ownership.^[6,7]

Rabies is a notifiable disease. However, once rabies encephalitis develops following bite(s) by a rabid dog, the outcome is always fatal.^[8]

The rising cases of dog bites in developing countries generally result in huge financial costs of care and majority of the victims in places without health insurance or due to ignorance may not afford the cost of the postexposure prophylaxis (PEP) and resort to use of herbal medications with the attendant development of rabies in majority of the cases.^[9,10]

The World Health Organization in collaboration with Bill and Melinda Gates Foundation has been at the forefront in the fight to break the “cycle of neglect” with regards to rabies prevention and control particularly in low-income countries through advocacy, surveys, and research on the use of new tools.^[11,11]

Furthermore, global efforts to eliminate rabies have focused on adequate mass-vaccinations of the reservoir animals—dogs as well as pre- and PEP of at-risk individuals and exposed victims, respectively.^[12,13] Despite these efforts, gross under-reporting of dog bite incidents as well as rabies-related mortalities are still prevalent in our setting.

This stems from weak health systems to cater for effective implementation of rabies prevention and control programs in the communities. Hence, the current study was aimed at describing the pattern and outcome of dog bites and rabies among patients (adults and children) presenting to University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu.

Subjects and Methods

This is a 10-year (January 1, 2004 to December 31, 2013) observational retrospective study conducted in the UNTH, Ituku-Ozalla, Enugu, South East Nigeria among children and adult population. Enugu is the capital of Enugu state which has an estimated population of about 3 million

people.^[14] The subjects were victims of dog bites and/or rabies seen at the accidents and emergency unit of UNTH, Enugu. Ethical approval for the study was sought from the Health and Research Ethics Committee of UNTH, Enugu.

Case definition of rabies was based on clinical history of previous dog bite(s) and consistent with the International Classification of Diseases, ICD₁₀ diagnostic criteria for rabies.^[15]

Relevant information sought from the case notes included bio data, place of occurrence of the dog bite (home/outdoor), type of dog involved in the bite, cause of bite (playing with the dog, provocation or unprovoked attack by an aggressive dog), site(s) and number of bite(s), vaccination status of the dog, history of preexposure prophylaxis, treatment received following the bite, and complications (of rabies) and its outcome.

All cases of dog bites and rabies that presented to the Accidents and Emergency Unit of UNTH, Enugu over the study period and met the study case definition were included in the study. The clinical data were extracted from the case notes and recorded using a semi-structured questionnaire while data was analyzed using SPSS version 17.0 [Chicago Illinois] Associations between variables were assessed with Chi-square while statistical significance was set at $P < 0.05$.

Results

A total of 149 cases of dog bites, of which 6 of them had rabies were identified and studied. Eighty-three (55.7) of the subjects were males while females were 66 (44.3%) giving a female to male ratio of 1:1.25. The mean age of the study subjects was 32 ± 1.8 (range: 4–65) years.

Children aged ≤ 18 (4–18) years had the highest burden of the cases of dog bites 83 (55.7%) with those 10 years and younger comprising the highest percentage 55 (36.9%) among all the age groups as shown in Table 1.

Ninety-six (64.4%) cases presented more than 24 h after their respective dog bite with 52 (35.0%) of them presenting more than 72 h after the incident as shown in Table 2.

Furthermore, majority of the cases of the dog bites were out-door occurrences, 94 (63.1%) compared to 55 (36.9%) that occurred at home by owned dogs. One hundred and twenty-two (81.9%) cases had at least one bite injury while 20 (13.4%) and 7 (4.7%), respectively, had two and >2 bites. Among the 6 cases of rabies, 2 (1.6%) had one bite, while 4 (20.0%) had at least two bites and the relationship was statistically significant ($P = 0.001$) as shown in Table 3. The culprit dogs involved in the bite were domestic dogs which have identifiable owners in 63 (42.3%) cases, while

stray dogs were responsible for the vast majority of cases 86 (57.7%).

Majority of the cases of the bites were from aggressive dogs attacking their victims un-provoked 81 (54.4%) while 38 (25.5%) and 30 (20.1%) cases resulted from provocation and while playing with the dogs, respectively.

The most common site of the bites was the lower limbs as observed in 84 (56.4%) cases followed by the forearm/hands (upper limbs) in 54 (36.2%), head and neck 8 (5.4%), and buttocks 3 (2.0%) of the cases, respectively. Sixty-one (40.9%) of the cases had the offending dogs quarantined while in the majority 88 (59.0%) of cases the culprit dogs were reported to have either ran away after attacking their victims or killed by angry mob.

Table 1: Age and sex distribution of cases of dog bite and rabies

Demographic characteristics	Frequency (n=149)	Percentage
Cases of dog bites		
Sex		
Male	83	55.7
Female	66	44.3
Age group (years)		
1-10	55	36.9
>10-20	30	20.1
>20-30	22	14.8
>30-40	12	8.1
>40-50	10	6.7
>50	20	13.4
	(n=6)	Percentage
Cases of rabies		
Sex		
Male	3	50.0
Female	3	50.0
Age group (years)		
1-10	1	16.7
>10-20	1	16.7
>20-30	-	-
>30-40	1	16.7
>40-50	2	33.2
>50	1	16.7

Table 2: Duration of dogs bites prior to presentation to hospital

Duration (in hours)	Frequency (n=149)	Percentage
1-12	23	15.4
>12-24	30	20.1
>24-48	27	18.1
>48-72	17	11.4
>72	52	35.0
Total	149	100.00

Majority of the cases of the dog bites 78 (52.3%) were from dogs with unknown records of rabies vaccinations, while 30 (20.1%) and 23 (15.4%) cases were not vaccinated or vaccination expired respectively. Only a few, 18 (12.1%) had records of up to date vaccinations. However, the relationship of the dog bites with evidence of rabies vaccinations was not statistically significant ($P = 0.166$) as shown in Table 4.

All the cases of dog bites that presented early (within the first 48 h), 143 (96.0%) had adequate medical care with resultant favorable outcomes while the 6 (4.0%) cases that had rabies never presented to hospital for their various dog bites, rather were seen after several weeks when they had developed obvious signs of rabies.

Of the 6 cases of rabies reported, 2 were children aged 9 and 15 years, respectively, while the remaining 3 were adults aged > 18 years as shown in Table 1.

All 6 cases (100%) of rabies were bitten by stray dogs out of which 4 (66.7%) of them occurred without any provocations (aggressive dogs) while 2 (33.3%) were following provocation of the dog of the culprit dogs. All the cases of bites that resulted in rabies were reported to have been treated at home with herbal medications following the dog bites but only presented to the hospital when the signs of rabies ensued.

The common clinical presentations of rabies among the subjects studied were hydrophobia (100.0%), photophobia (33.3%), fear to eat solid foods (16.7%), aggressiveness (33.3%), and generalized spasms (tonic-clonic convulsions) in 3 (50.0%).

The common treatment received by the rabies cases were combination therapy of antirabies immunoglobulin, rabies vaccines, and sedatives among others.

Table 3: Outcome of the dog bites and the number of bites relationship

Outcome	1 bite n=122 (%)	2 bites n=20 (%)	>2 bites n=7 (%)
Rabies	2 (1.6)	4 (20.0)	0 (0.0)
Favorable	3 (2.5)	0 (0.0)	1 (14.3)
Not report	117 (95.9)	16 (80.0)	6 (85.7)

$\chi^2=19.970, P=0.001$

Table 4: Outcome of the dog bites and evidence of rabies vaccination relationship

Outcome	Up to date evidence of evidence of n=17 (%)	Rabies vaccination expired n=23 (%)	Not vaccinated n=30 (%)	No history about the status of dog n=78 (%)
Rabies	0 (0.0)	0 (0.0)	0 (0.0)	6 (7.7)
Favorable	1 (5.9)	0 (0.0)	2 (6.7)	1 (1.3)
Not reported	16 (94.1)	23 (100.0)	28 (93.3)	71 (91.0)

$\chi^2=9.132, P=0.166$

Pertaining to the outcome of the rabies cases, all the 6 (100.0%) cases were reported dead while on admission. The mean duration of hospitalization for the six cases of rabies was 3.25 ± 1.49 days.

Discussion

The six cases of rabies seen over the period under-review may be a gross under-representation of the magnitude of the problem in our setting. This is partly due to the fact that many cases of rabies could have died in the communities while some that presented to the hospital could have been mis-diagnosed as some forms of viral encephalitis.^[16-18] However, other similar studies in Nigeria have reported fairly higher number of cases.^[19-21]

Majority of the victims of the dog bites were children. This finding compares well with reports by other workers in Nigeria,^[19,22] and Tanzania in Southern Africa.^[23] Children as a result of their curiosity, lack of inhibition, limited knowledge, and experience about dog behavior and most importantly inability to protect themselves from attacks from dogs may be partly responsible for the higher number of bites in pediatric population.^[5] Furthermore, it is known that children are more likely to suffer multiple bites including bites to the face and head that have high innervations with a higher propensity to contraction of rabies infection.^[3,24]

Most of the cases of the dog bites were by stray dogs that attacked their victims aggressively without being provoked. Other workers have reported similar experience.^[22] In some countries with high population of stray dogs, dog bites are known to be common.^[5,6] And such large population of stray dogs arise from poor dog ownership where dogs belonging to individuals and/or families are left uncared for and unsupervised with partial or no restriction and some other times the stray dogs might have migrated from other areas. For a significant reduction in the incidence of human rabies in Nigeria, there is need to control stray dog population in both urban and rural areas through proper education of the populace on the need for proper care of their dogs including animal vaccination, and culling of stray and ownerless dogs.^[24,25]

Lower limbs were the most common sites of the bites, usually, following out-door attacks by stray dogs. Victims that had multiple bites are more likely to have increased risk of viral transmission.^[3] Similar findings were observed in the present study as four of the cases of rabies had multiple bites by stray dogs.

The mean duration of hospitalization for the six cases of rabies was 3.25 ± 1.49 days, and all died giving a 100% case fatality rate similar to other reports.^[7,26]

Although a case of survival had been reported following a chemically induced coma using a combination of ketamine and midazolam (Milwaukee protocol/Winsconsin protocol) and antiviral therapy^[27] in a 15-year-old who had rabies following a bite from a bat. Despite this reported medical success, human rabies is still almost always fatal. The traditional therapy offered to the rabies cases in our series were un-helpful as all the 6 cases of rabies reported died while on hospitalization.

All the cases of rabies in the present study were from rural areas where poverty, ignorance, and poor dog ownership culture abound. Worse still, all the cases of rabies initially had herbal medications and only presented to the hospital when obvious clinical rabies ensued as was also reported in a South African Study in KwaZulu-Natal.^[7]

Evidence from the current study showed that the majority of the dogs involved in the bites were poorly vaccinated or unvaccinated for rabies. Such low vaccination rates in the dogs as in a similar Nigerian study,^[22] are of serious public health concern as it mitigates against effective control of rabies in Nigeria compared to most developed world where mass-vaccination of domestic dogs has successfully eliminated or controlled domestic dog rabies.^[2,28]

However, human rabies is a vaccine-preventable disease if suspected exposures are promptly identified and effective therapy applied.

Majority of the cases of dog bites in the present study sought health care after 24 h of the incident. It is well-known fact that prompt and effective PEP almost always gives full protection from the development of rabies following the bite(s).^[29] The dog bite cases that had rabies never presented to the hospital for PEP but were only seen when they had developed furious signs of rabies.

Recent efforts by the Nigerian federal ministry of health include declaration of free treatment of victims of dog bites including administration of PEP in all federal tertiary hospitals and the establishment of a steering committee on the implementation of the "Rabies in West Africa Project" charged with the goal to reduce the incidence of rabies drastically in Nigeria and the West African sub-region within 5 years.^[30]

In conclusion, bites from unvaccinated or poorly vaccinated, stray dogs still bound in our setting with some cases resulting in human rabies particularly among rural dwellers with limited access to health care including PEP.

There is urgent need to create and strengthen awareness campaigns on control of rabies infections through responsible dog ownership including their regular vaccinations as well

as provision and use of prompt PEP in human cases of dog bites at all levels of health care.

Limitation of the study

Inability to determine the category of the dog bites due to the retrospective nature of the study.

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