



Animal and Human Bites in Children

Animaux Et Les Morsures De L'homme Dans Les Enfants

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ABSTRACT

BACKGROUND: Mammals that live closely and interact with man and man himself can inflict injury on children in the home through bites. Previous reports on mammalian bites in Nigeria are few and mainly on dogs, though other mammals also inflict injuries on children. There are also no reports on the injuries arising from the bites of these other mammals.

OBJECTIVE: To document the range, pattern, distribution and complications of mammalian bites in children.

METHODS: The hospital records of all patients aged 18 years and below with history of animal and human bite admitted over a twelve-year period from January 1994 to December 2005 were analysed retrospectively.

RESULTS: There were 105 episodes of human and animal bites recorded in the registers of the hospital but the case notes of only 83 (79%) could be found. The male to female ratio for cases bitten was 2: 1. There were 62 (74.7%) cases of dog bites, 17 (20.5%) of human bites, 3 (3.6%) rat bites and 1 (1.2%) monkey bite. Of the dog bites, 68% were by vagrant and unvaccinated animals. The children presented with superficial and deep tissue injuries. Rabies was the most severe complication noted.

CONCLUSION: Dogs are the most common mammals involved in the biting of children. Such bites lead to many morbidities and mortalities; bacterial and viral infections and death. There is a need to enforce the existing policy on the control of dogs and animals generally. *WAJM* 2011; 30(6): 421–424.

Keywords: Mammalian bites, injuries, children.

RÉSUMÉ

CONTEXTE: Les mammifères qui vivent en étroite collaboration et d'interagir avec l'homme et l'homme lui-même peut infliger des blessures sur les enfants dans la maison par les piqûres. Les précédents rapports sur les morsures de mammifères au Nigeria sont peu nombreuses et principalement sur les chiens, même si d'autres mammifères aussi infliger des blessures sur les enfants. Il n'existe pas non plus des rapports sur les blessures subies par les piqûres de ces autres mammifères.

OBJECTIF: Documenter la gamme, modèle, la distribution et les complications de morsures de mammifères chez les enfants.

MÉTHODES: Les dossiers de l'hôpital de tous les patients âgés de 18 ans et moins ayant des antécédents de l'animal et morsure humaine admis au cours d'une période de douze ans à partir de Janvier 1994 to Décembre 2005 ont été analysés rétrospectivement.

RÉSULTATS: Il y avait 105 épisodes de morsures humaines et animales inscrites dans les registres de l'hôpital, mais les notes de cas de seulement 83 (79%) n'a pu être trouvée. Le ratio homme-femme pour les cas mordus était de 2: 1. Il y avait 62 (74,7%) des cas de morsures de chien, 17 (20,5%) des morsures humaines, 3 (3,6%) et 1 morsures de rat (1,2%) morsure de singe. Parmi les morsures de chien, 68% étaient des animaux errants et non vaccinés. Les enfants se sont présentés avec les blessures des tissus superficiels et profonds. La rage a été la complication la plus sévère a noté.

CONCLUSION: Les chiens sont les mammifères les plus communs impliqués dans la morsure des enfants. Ces piqûres conduire à de nombreuses morbidités et des mortalités, des infections bactériennes et virales et de la mort. Il ya une nécessité d'appliquer la politique existante sur le contrôle des chiens et des animaux en général. *WAJM* 2011; 30 (6): 421–424.

Mots-clés: les morsures de mammifères, les blessures, les enfants.

INTRODUCTION

Mammals such as dogs, cats and rats live closely to man and so there is the likelihood that they can inflict injury on man in the home environment. Humans also come in contact with other animals like monkeys and ferrets that some families keep as pets. In addition, man may come in contact with wild dogs which may stray into living areas or in the forests while engaging in hunting and picnics. Hence, these animals in attempting to defend themselves can inflict bites on man if unduly provoked or mal-handled. Dogs have been reported by Ginsburg¹ to be responsible for over 50% of the biting episodes, while cat and human bites account for 6 % and 3% respectively. These bites are not innocuous because they result in varying degrees of physical injuries¹⁻³ to the victims as well as infectious⁴⁻⁶ and non infectious¹ complications. The range of tissue injuries includes abrasions, lacerations, puncture and crush wounds involving the skin, tendons and muscles.

The wounds resulting from the bites are also contaminated by microbes on the skin of the injured person and saliva in the mouth of the biting mammals.^{1,4,5} Hence, the possible infectious complications include cellulitis, lymphangitis, pyomyositis, tetanus and rabies as well as septic arthritis, osteomyelitis, abscesses, bacterial tenosynovitis, bacteraemia, septicaemia and meningitis. Non-infectious complications resulting from mammalian bites reported by Sacks and colleagues³ include hemorrhagic shock, permanent damage to tissues and deformity as well as emotional stress and phobia for animals.

This study focused on the range of mammals involved in inflicting bites on children in Benin City and the pattern, distribution and complications of injuries sustained from the bites. It is expected that the study will stimulate further research into the various aspects of mammalian bite injuries and related complications in Nigeria as well as contributing to the body of information on the subject.

SUBJECTS, MATERIALS, AND METHODS

The records of all patients aged 18

years and below who presented to Modic Medical Centre with history of an animal or human bite from January 1994 to December 2005 were analysed retrospectively. The data retrieved and entered into a specially designed questionnaire included age, sex, history of bite, site of bite, ownership and immunisation status of the animal, presenting symptoms, mode of management and outcome.

Production or confirmation of a vaccination certificate was taken as proof of immunisation of a dog. The diagnosis of rabies was based on clinical features of encephalomyelitis and hydrophobia in any of the patients with a history of bite from dogs and other animals.

RESULTS

There were 105 episodes of bites recorded in the registers of the Out Patient Department. The case files of 83(79%) patients were retrieved. Of these, 62 (74.7%) had dog bites, 17(20.5%) human bites, three (3.6%) rat bites and one (1.2%) monkey bite. Dog bites occurred in 42 males and 20 females. There were 29 children aged < 5 years and 20 aged 6–10 years. The distribution of the children with dog bites is shown in the following Table.

Table 1: Distribution of Children Bitten by Dogs

Age Group (Yrs)	Number (%)		
	Males	Females	Total
1-5	19(45.2)	10(50.0)	29(46.8)
6-10	12(28.6)	8(40.0)	20(32.3)
11-15	6(14.3)	2(10.0)	8(12.9)
≥16	5(11.9)	–	5(8.0)
Total	42(100)	20(100.0)	62(100.0)

There were 17 cases of human bite, 10 males and seven females, of whom six were aged < 5 years, seven, aged 6–10 years, three were 11–15 years and one was older than 16 years. The bites had been inflicted by females in 12 and males in 5 cases. The three cases of rat bite were in two boys aged 2 and 4 and a girl aged 5 years. The only case of monkey bite was a boy aged eight years.

The distribution of the sites of the body on which the bites were inflicted by the mammals and the mammals shown in Table 2.

Table 2: Sites of Mammalian Bites in 83 Children⁺

Site	Dog	Human
Legs	29	–
Thighs	14	–
Buttocks	10	–
Feet / Ankle	1	–
Fore –arm	4	3
Arm	–	1
Hand	3	2
Chest	–	6
Face	1	5

⁺ Rat bite – feet/ankle (3); Monkey bite – thigh (1).

Ownership and Vaccination Status

Of the 62 dogs, 37(%) and 25(%) were domestic and stray respectively. Twenty (%) domestic dogs were vaccinated while 11(%) and six (%) were not vaccinated and without known vaccination status respectively. The only monkey involved was said to be vaccinated.

Presenting Symptoms

The children presented with multiple symptoms including pain, scratch wounds, abrasions, laceration and puncture and bleeding as well as fever and convulsion. There were 20 cases of scratch wounds and 50 episodes of various degrees of abrasions and laceration in addition to four children presenting with high grade fever a week following dog bite while another one had generalized convulsions as well, three weeks after a history of dog bite. Three children with dog bite presented with cellulitis while one case had lymphangitis as well.

Wound Management and Outcome

The fresh wounds were cleaned with soap and water and left open to dry and heal. The lacerations were not sutured but cleaned daily until healing was achieved. Tetanus toxoid was administered to all the victims while anti-rabies vaccination was administered to all cases of bites by the stray dogs and unvaccinated animals. The anti-rabies vaccine was not administered to the children bitten by the vaccinated animals.

Treatment was successful in 82 children, 61 with dog bites, 17 with human bites, three with rat bites and one with

monkey bite. A 10-year-old girl had rabies and died on the second day of admission.

DISCUSSION

Range of Mammals

The study has revealed that the range of mammals involved in the biting of children in Benin City, included humans, dogs, rats and monkeys. It also showed that dog is the predominant mammal responsible for the infliction of bites on children in Benin City. Thus, 74.7 % of the mammalian bites were attributed to dogs while other mammals were responsible for 25.3% of the injuries. This finding concurs with reports from other regions of the world^{1,3,7} and is not surprising because dogs are closely associated with man either as pets or for security purposes. Consequently, children often due to inexperience or inquisitiveness either indulge the animal in inappropriate play activities or harassment and in doing so can be bitten by the dog.

Characteristics and Immunisation Status of the Dogs

When characterised into domestic and stray animals, domestic dogs are more frequently involved in the biting of children than stray dogs. This is likely due to the fact that many families in Benin City keep dogs as pets and for security purpose. The fact that 40 % were from vagrant dogs suggests that dogs frequently escaped domestication because of neglect by owners and become wild animals in the community. These itinerant dogs in the process of scavenging for food can inflict injury on man generally and children in particular, who may constitute a hindrance to the animal's movement. It is of interest that rate of 40.3% of the biting episodes in Benin City by stray dogs are much lower than the value of 60.3% reported from Kano⁶ in Northern Nigeria. The explanation for this difference is not clear but may be related to low patronage of health facilities by victims of such stray dogs because of ignorance. It may also mean that people are sufficiently aware of the dangers of stray dogs and so avoid them completely. It is remarkable that the majority of the dogs did not possess valid evidence of vaccination against rabies as

at the time of the bite. Therefore the victims of the bites were highly prone to the development of rabies as was the case in one of the victims bitten by a stray dog in this study.

Sites and Types of Injuries and Complications

The lower limbs were the most frequent sites of the bites by the dogs while human bites targeted the upper limb and face. Thus, the sites tend to suggest that the dogs pursued the children after being provoked by them. Parts of the upper limbs and face are easily reached by the mouth during squabbles between children. In the same way, the foot is frequently contaminated by food items that attract scavenging rats.

Most of the wounds sustained from the bites were superficial injuries which agree with the findings of previous reports^{2,3} on animal and human bite injuries. Nonetheless some of the wounds were serious as noted in 10 of the children who had puncture wounds with haemorrhage. However, none of the children in this study died as a result of these puncture wounds. Expectedly, puncture wounds leading to haemorrhage can cause death in the absence of early and adequate medical intervention as noted by Sacks *et al.*³ Cellulitis and lymphangitis are the bacterial infections of the soft tissues and lymphatic channels respectively and both are reported to frequently follow animal and human bite injuries.²⁻⁵ Fortunately these bacterial infections are amenable to appropriate antibiotic treatment as was the case in this study.

Human rabies is a viral infection of the central nervous system often transmitted by contamination of a wound with saliva from a rabid animal. It is also in tandem with the observation by Turner⁸ that dogs are by far the most important vector of rabies in Africa and Asia unlike in USA where cats predominate. Rabies is therefore a major public health challenge in areas with no policy on the control of dogs like in Nigeria and most of Africa. Hence, the highest proportion of human rabies occurs in Africa and Asia where many families maintain dogs as pets and for self-protection.

Human and other Mammalian Bites

This study has confirmed the observation by others^{1,2} that human bite is the next most common form of mammalian bite injury in children. This is likely due to the fact that children frequently deploy biting as tool for self defense during squabbles and peer rivalry. On the other hand, a child with psychological disturbance may engage in indiscriminate biting of themselves and other children.⁹ Fortunately, this form of human assault was not encountered in this study.

Bites by other Mammals

Rat bite was the other notable finding in this study, though the proportion of the bite is insignificant in comparison with either dog or human bites. Nonetheless, rat bite is a reflection of the poor and unsatisfactory hygienic living conditions in homes as is the case in Nigeria. Rats are attracted to places with filth like leftover food particles in the homes. Consequently, poor environmental control and personal hygiene may explain the involvement of rats in cases of mammalian bites in this study. The apparent low proportion of cases of rat bite in this study may be likely due to under reporting by the victims because of the minor injuries sustained.

The only case of monkey bite is important because it reflects a change in the attitude of Nigerians towards the animal. The animal was hitherto not known to be kept as pet in this country. Moreover, monkeys do not roam the streets in Benin City but are found either in the zoo or jungle. Hence, when the animal lives in proximity to man as pet, it may bite children or any person for that matter who either engage them in inappropriate play activities or harass them unduly as was noted in our patient. The proportion of cases of monkey bites may increase as more of them become domesticated as noted by Macbean and co-workers.²

It is also noteworthy that cat bites were not among the cases being reported in this study. This is not surprising because people of Benin do not keep cats as pets because of its linkage to incalculable spiritual and physical harm to man.

Age and Sex Predilection of the Children to Mammalian Bites

The majority (79.1 %) of the children bitten by dogs were aged 10 years or less and this pattern of age predilection reflects the inexperience of children generally and possibly indicates their inquisitive and adventurous nature as was also highlighted by other workers.^{1-3,6} Hence it is appropriate to advise that children less than 10 years old should be supervised closely by parents and care givers and protected from unwarranted attacks from domesticated and wandering animals. In addition, human bite commonly involved children less than five years of age which may suggest that the bites are likely protective action during peer group rivalry.

This study demonstrates that males are frequently the victims of the human and animal bites as was also noted in other reports.^{1,2,6} This finding may imply that boys are more likely than girls to either harass or engage animals in high risk activities like playing hide and seek games. It is remarkable that girls are often involved in biting boys; thus signifying that the episodes are protective measures by females against the likely domineering attitude and possible hostility by males.

More males than females were involved in the episodes of rat bites and likely reflect a better hygienic disposition by females. The assault by the monkey was the result of inappropriate engagement of the animal by the victim. The male sex is thus a risk factor for mammalian bite in Benin City as reported as well by others.^{2,6,10,11} Consequently, parents and care givers are to guarantee close supervision of all young people particularly male children in the prevention of animal and human bites.

Limitation of the Study

This study is limited by the fact that it is a hospital based research reflecting only the cases that reported to the health facility. Thus, it excluded cases of bites that either stayed at home or treated in other health facilities. Consequently, this study does not represent the true picture in the wider community. Moreover, it is a descriptive retrospective study which has the disadvantage of incomplete data retrieval as noted earlier in this study.

Additionally, this study design is confronted with the pitfall of drawing causal inferences when none probably exists as highlighted by Wingo and co workers.¹²

Nonetheless, the findings of this study are useful because it has provided an insight into the problems associated with the interaction of children with themselves and domesticated and vagrant animals in the community generally. Therefore, it is of utmost importance that this descriptive retrospective study has provided a basis for conducting prospective community based cross sectional, surveillance and ecological correlational studies¹³ on various aspects of animal and human bite injuries in Nigerian children.

Conclusion and Recommendations

This study has highlighted the range, pattern, distribution and complications of mammalian bites in children. Dogs and humans are frequently involved in the biting of children in Benin City. Complications arising from the bites include superficial and deep tissue injuries and infections. Rabies is the most significant infection leading to death in this study.

There is a need to implement the existing policy on the control of dogs and animals in general by the appropriate authority. For instance, all dogs must be claimed by their owners and be fully immunized against rabies and other infections. Moreover, all domesticated dogs and other animals should be well kept by their owners. In addition, parents and care givers should closely supervise the interaction of children with the animals.

Stray dogs are also to be quarantined and destroyed by the Animal Control Unit of the Ministry of Agriculture. Those with suspicious behavior should have post mortem performed on them and search for the presence of characteristic negri bodies in the brain. Parents are to be enjoined as well to counsel their children against the habit of indiscriminate biting as tool for aggression and self defense.

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