



Dog Bites and Rabies: A Decade Perspective in Nigeria (2005-2014)

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ABSTRACT

Rabies is a fatal zoonotic encephalitis caused by the rabies virus commonly transmitted to human and other mammals by dog bites. A 10 year review of dog bite cases in humans from 2005 to 2014 was undertaken from archives of the rabies laboratory, National Veterinary Research Institute (NVRI) Vom, Nigeria to assess the magnitude of dog bites and associated risks of human exposure to rabies among bite victims. Of the 1, 840 cases reported, the highest and the lowest rates of bite occurred on 2009 and 2007 respectively. Children constituted 31.5% of the victims, 36.0% were adults, while 32.5% had no age indications. Male victims formed 46.7% of the cases, 38.4% involved females while the genders of the remaining 14.9% were not given. Similarly, prevalence of rabies cases were highest and lowest in 2009 and 2007 respectively while the overall prevalence of rabies-positive dog bite cases during the decade were high (61.1%). However, rabies public campaigns by indigenous veterinary professional groups during the initial editions of the world rabies day improved the level of awareness, which possibly led to the rise in reported cases of dog bites in 2009, while the considerable drop in the cases and probably in rabies in subsequent years, could have been due to vaccination of a considerable number of the dog population. Appreciable reduction in dog bite cases and in rabies nationwide in Nigeria, are only achievable when stakeholders determine to tackle dog bites by supporting responsible ownership and annual mass vaccination of dogs and cats against rabies as well as quarantining or controlling their movements. In rural Africa, where the risk of dog bites and rabies is greatest, it is important to raise public awareness on the roles of accurate laboratory diagnosis and surveillance in the national rabies control and monitoring program.

Key words: Dog bite cases, Humans, Rabies, Nigeria

INTRODUCTION

Rabies is caused by a negative sensed, ssRNA-virus in the Lyssavirus genus, Rhabdoviridae family of the Mononegavirales order and results in approximately 59,000 human deaths yearly worldwide (Freuling et al., 2012 and Hampson et al., 2015). It is characterized by gross neglect and under reporting (Mallewa et al., 2007) in regions where it is endemic due to ignorance of its dangers, human exposure, poverty, traditional beliefs and limited political will on the part of the political authorities (Ezebuoro et al., 1980 and Tekki et al., 2013). Consequently, victims of infection may not receive appropriate medication and could die unreported (Hampson et al., 2015). Rabies is mainly transmitted to humans through bites by infected animals, especially dogs, cats and bats, via their infective saliva (Christopher and Pereira, 1972; Kasempimolporn et al., 2000; WHO, 2007). Significant number of dog bites occurred in tens of millions of people worldwide each year (WHO, 2013), mostly in children (Ellis and Ellis, 2014; Presutti, 2001 and WHO, 2013). In Nigeria, approximately 99% of human rabies resulted from bites of domestic dog, which is the major maintenance and vector host species of the virus causing the disease with wildcats, jackal species, hyena and civets as possible wildlife reservoir hosts (WHO, 2013). Karshima et al. (2013) reported an incidence of 46.7% rabid dog bites among humans in a review of two months cases of rabies in a government veterinary clinic while Aworh et al. (2011) reported a prevalence of 52.9% of dog bites in children in 10 years study carried out in a hospital in Nigeria. However, the magnitude of dog bites and their consequences in rabies transmission from a nationwide perspective is not known. Therefore, the study was designed to determine the prevalence of dog bites and investigate the associated risks of human exposure to rabies among the bite victims, from the analysis of available data on confirmatory diagnosis of rabies at the National Veterinary Research Institute (NVRI), Vom, Nigeria from 2005 to 2014.

MATERIALS AND METHODS

The National Veterinary Research Institute, Vom, Nigeria, has as one of its mandates, the diagnosis of animal diseases of economic and public health importance, including rabies, in the country. Animal specimens were received from all over the country for diagnosis of various animal diseases in the facility. For post mortem confirmatory diagnosis

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of rabies in animals, specimens submitted to the laboratory included: the head or fresh brain, salivary gland or at times a whole carcass of rabid suspect animal in cold condition or in 50% glycerol saline. Dog bite cases, ages and genders of dog bite victims and rabies infection status of the dogs involved in the bites between 2005 and 2014 were reviewed and results presented by descriptive statistics. During the period under review, a total of 2141 dog samples were received and tested for rabies.

RESULTS

The overall prevalence of dog bite cases was 85.9% (1840/2141), while the overall prevalence of dog bite cases that tested positive was 61.1% (1124/1840). Of the total 1840 dog bite cases among humans, the highest was 16.2% (298/1840 cases) which occurred in 2009, followed by 13.4% (246/1840 cases) in 2011 while the lowest of 5.9% (109/1840 cases) was recorded in 2007, followed by 7.1% (130/1840 cases) in 2010 (Figures 1 and 2). The highest prevalence (85.2%) of bite cases by rabid dogs occurred in 2009 followed by 74.6% in 2010 and 73.0% in 2008, while the lowest prevalence of 42.2% followed by 44.0%, were recorded in 2007 and 2006 (Figure 3) respectively. However, the overall prevalence of rabies-positive dog bite cases during period under review was 61.1%.

Total bite victims that were children were 579 (31.5%) of which 333 (57.5%) were males, 222 (38.3%) were females but the ages and genders of 24 (4.2%) were not on record (Figure 4). A total of 663 (36.0%) adults were bitten, with 335 (50.5%) males, 316 (47.7%) females while the genders of 12 (1.8%) adults were not provided. However, the ages of 598 (32.5%) of the victims were not on record. In addition, 860 (46.7%) of the cases documented involved male victims, 707 (38.4%) involved females while the genders of 273 (14.9%) of the victims were not supplied to the laboratory (Figure 5). Record of vaccination of the dogs involved in the bite cases were as follows: dogs with up to date vaccination were 45 (2.4%), 29 (1.6%) had expired vaccination, 944 (51.3%) had no history of vaccination and 822 (44.7%) had no information on vaccination (Figure 6).

DISCUSSION

Eleven dog bite cases per million and 6.6 positive cases per million people (using population estimate of 170 million), and the mean annual dog bite cases of 184 in Nigeria as recorded in the study was quite alarming. Although the mean bite cases was much higher than the 92 dog bite cases reported from a similar study conducted in 20 local government areas of Bauchi state in the country the true figure of dog bites among humans in the country was certainly much higher as the only cases received at the rabies diagnostic facility were represented in this study (Bello et al., 2007). Many other cases must have occurred unreported as previously documented (Fagbami et al., 1981 and Mallewa et al., 2007). Overall prevalence of rabies-positive dog bite cases in this study was slightly higher than the incidence of 46.7% rabid dog bites in humans in a review of two months cases of rabies in a government veterinary clinic in Nigeria (Karshima et al., 2013). As expected, the national prevalence of dog bite cases based on sample submission to the diagnostic facility over the years was higher than in the localized hospital/clinic studies (Karshima et al., 2013). In this study, there was an approximately two fold increase in prevalence dog bite cases from 2007 to 2008 and from 2010 to 2011, while there was more than two fold drop in prevalence from 2009 when the dog bite cases were highest, as compared to 2010 (Figure 1). The rise in prevalence of dog bites in 2009 (Figure 2) could be an indication of improvements in reporting dog bite cases following supposed increase in awareness on rabies through public lectures, talks, radio and television programs and free dog rabies vaccination campaigns observed during the 2008 and 2009 editions of the WRD by various groups of veterinarians, paravets and veterinary students across Nigeria (Tekki et al., 2013). Much of these campaigns were carried out, in the central states of Nigeria, from where majority of diagnostic specimens were received. It was however observed that the prevalence of dog bite cases and perhaps rabies cases, dropped considerably in subsequent years (Figure 2) probably due to a good number of dog population getting vaccinated during the above mentioned campaigns (Tekki et al., 2013).

An increase in the prevalence of bite by dogs that tested positive for rabies was also observed from 2008 to 2010 (Figure 3). This increase was ascribable to the replacement of the less sensitive "Sellers staining diagnostic technique" previously employed in rabies diagnosis, with a more sensitive, specific and globally acceptable fluorescent antibody test in 2009, which could have led to achievement of accurate diagnosis, in addition to the previously mentioned possible causes (OIE, 2013). Although, there were relative drops in prevalence of rabies among biting dogs from 2011 and above (Figure 3), these were still higher (above 50%) than it were between 2005 and 2007 (below 50%), due probably to the previously mentioned campaigns and adoption of the more sensitive diagnostic technique. Also, although the 31.3% involvement of children in dog bite cases observed in this study (Figure 4) was quite high, it disagreed with the 52.9% reported in another study carried out in a hospital in Nigeria (Aworh et al., 2011). However, this rate of dog bites was slightly lower than the 63% reported in Iraq by Horton et al. (2013). It is not unlikely that under reporting as well as poor

documentation of cases from the field is responsible for this disparity in incidences. Non-availability of records of age groups of children in which 32.5% of the cases occurred (Figure 4) and the genders of bite victims in 14.9% of cases (Figure 5) were evidences of poor and under reporting of cases in this study. Contrary to popular reports of higher incidence of dog bites in children than adults (Familusi and Moore, 1972; Presutti, 2001 and WHO, 2013), we observed a higher occurrence in adults in this study. Majority of dog bites in children have been reported to be due to provocation of dog by chasing/teasing, pulling its tail, fur or ear, playing with the dog when sick, when eating or with its food (Buchanan, 2015). The dog may also be overprotective while the child is ignorant of boundaries and limits (Buchanan, 2015). Due to their body size in relation to little children, dogs may consider they are superior and would not dread the children. In addition people, especially Africans, do not educate their children on how to handle and act around animals (WebMD, 2015). The highest risk of rabies is in the poorest regions of the developing countries, where domestic dog vaccination against rabies is not extensively executed, coupled with limited access to post exposure prophylaxis (Hampson et al., 2015). Neighbourhood or community dogs and outright stray dogs are poorly fed and not confined, but gather in packs and facilitates easy contact between dogs and humans/domestic animals/wildlife and cycle of dog bites and endemic canine rabies can be easily maintained with increased human exposure risk to rabies (Atuman et al., 2014). These have resulted in approximately 59,000 annual premature death and loss of productivity due to rabies (Hampson et al., 2015).

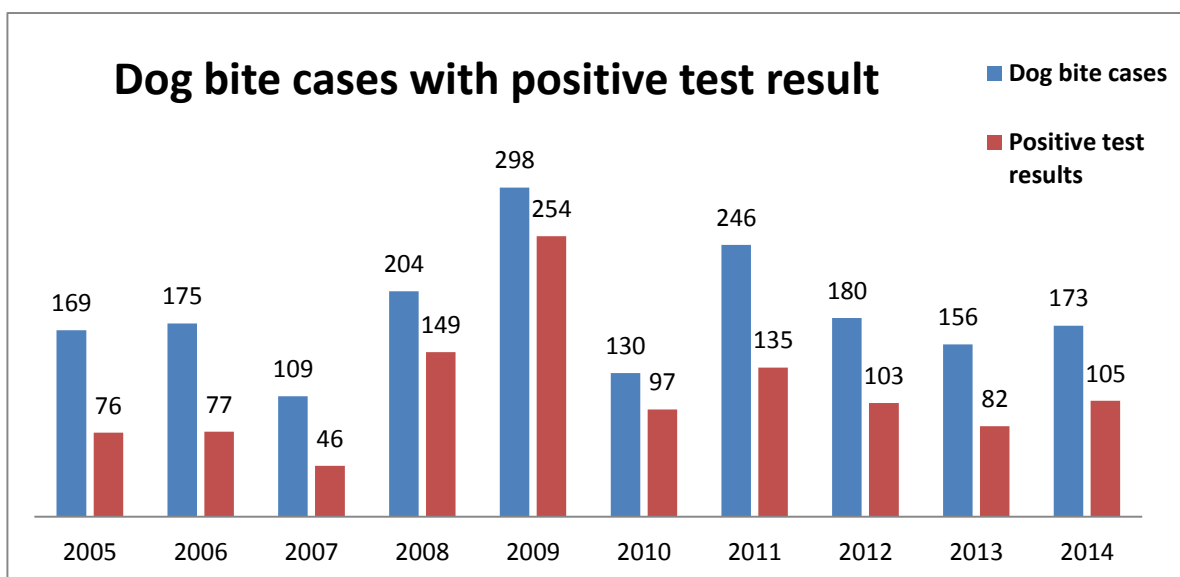


Figure 1. Annual human dog bite cases in Nigeria from 2005 to 2014, showing numbers of confirmed rabies positive cases

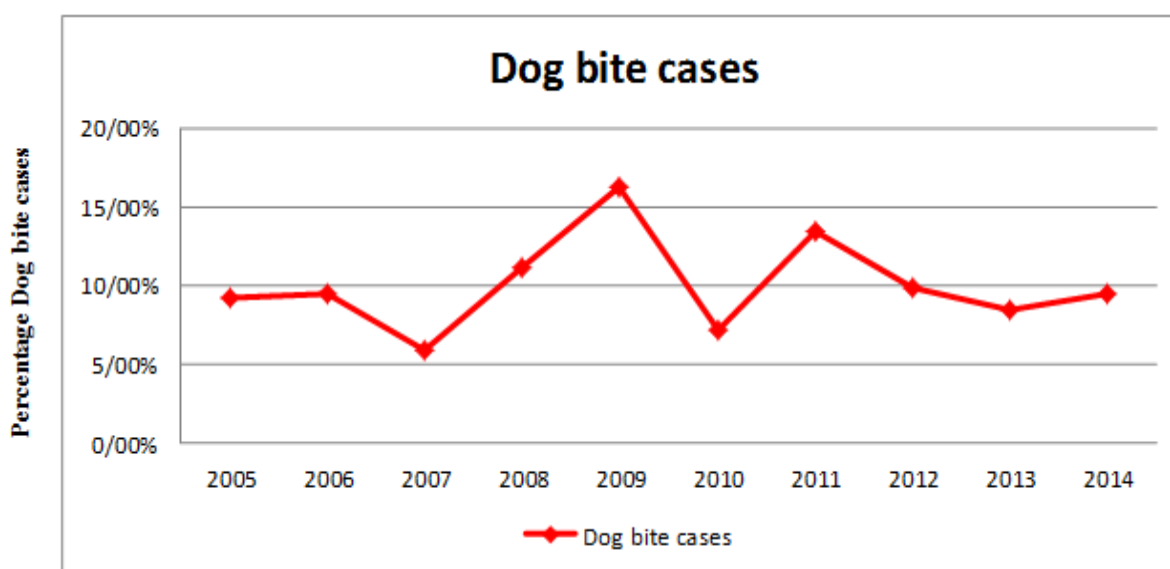


Figure 2. Percentage of annual human dog bite cases in Nigeria, from 2005 to 2014

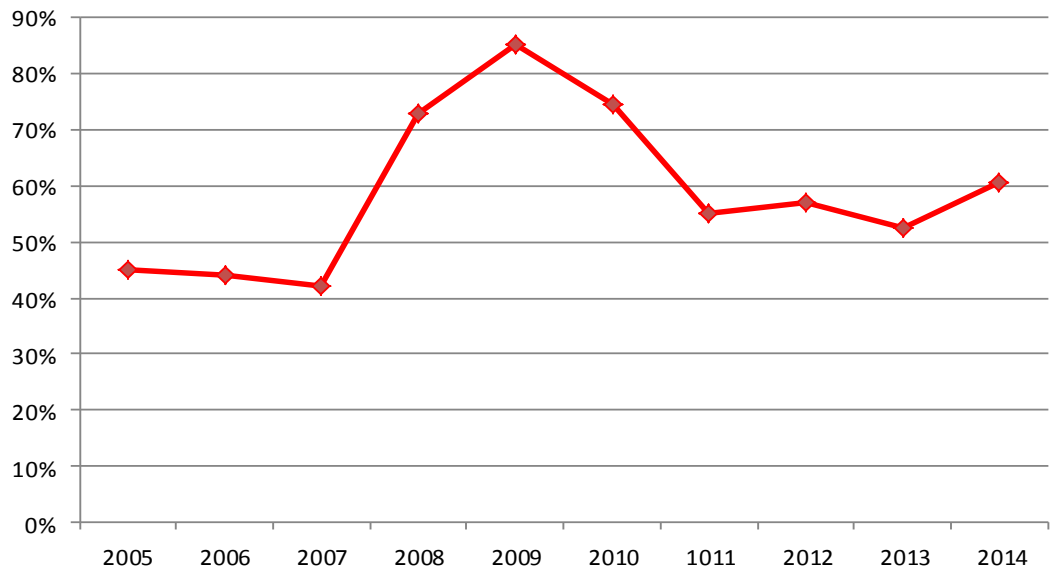


Figure 3. Percentage of annual dog bites cases confirmed to be rabies positive in Nigeria from 2005 to 2014

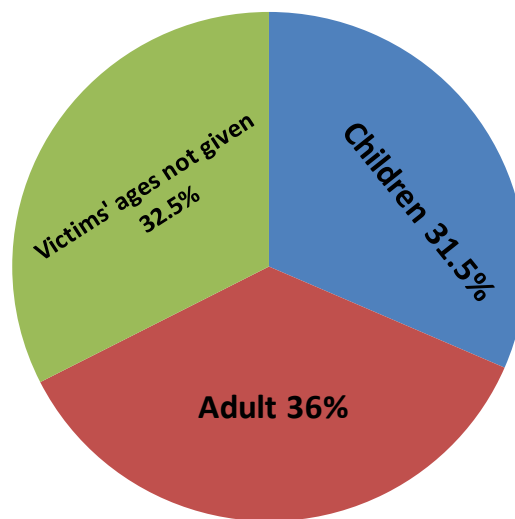


Figure 4. Overall distribution of dog bite cases by age of victims in Nigeria, from 2005 to 2014

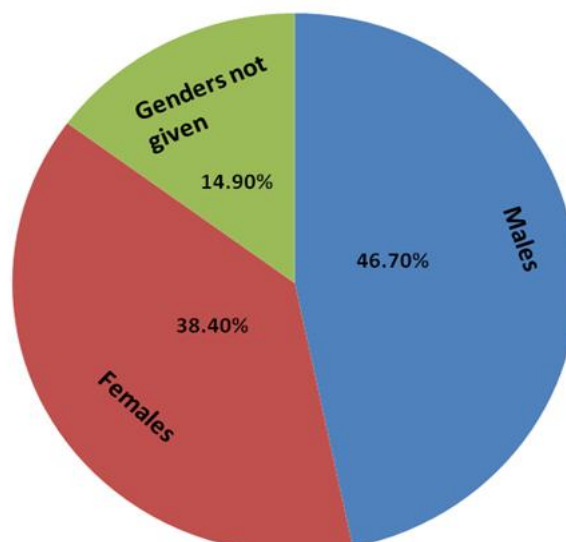


Figure 5. Overall distribution of dog bite cases by genders of victims in Nigeria, from 2005 to 2014

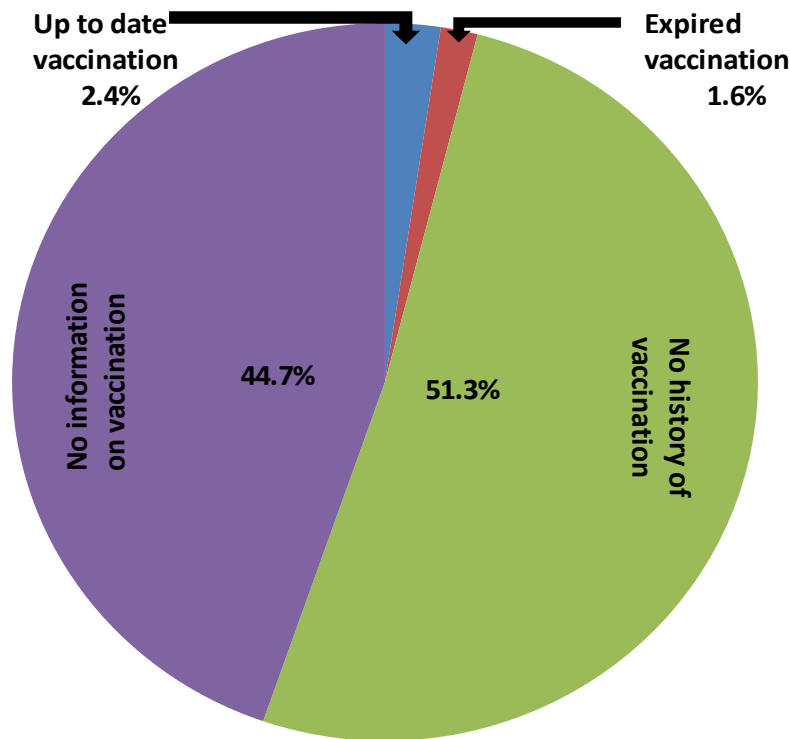


Figure 6. Overall distribution of dog bite cases by rabies vaccination status of biting dogs in Nigeria, from 2005 to 2014

CONCLUSION

Dog bite cases recorded in the last decade in Nigeria were quite alarming. The overall prevalence of rabies-positive dog bite cases during the period was also very high. Proofs of under reporting of cases as previously reported were observed in the study. For an appreciable reduction in dog bite cases and rabies in affected regions therefore, all tiers of government, NGOs, public spirited organizations and individuals need to make concerted efforts in tackling dog bites and rabies by embarking on or supporting annual vaccination of dogs, cats, foxes and sylvatic reservoir hosts against rabies as well as quarantining or controlling their movements. Creation of public awareness in rural Africa, where the risk of dog bites and rabies is greatest, are also necessary measures in reducing the risks. Accurate laboratory diagnosis and surveillance need to be supported by all stakeholders for effective control program.

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Competing interests

The authors have no competing interests to declare.

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