



## Human death from suspected rabid dog bite in Zamfara State, Nigeria

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### Abstract

Rabies is a neglected zoonotic disease occurring mostly as a result of dog bites and with a case fatality rate approaching 100% in humans. We describe here a suspected case of human rabies from a stray dog bite in a 52-year-old woman in Zamfara State, northwest Nigeria. In response to the exposure, a team of researchers was set up to investigate further the possible contacts between the rabid dog and the subjects at risk. Rabies was identified based on clinical signs observed on the victim, in addition to exposure history and incubation period. Rabies is becoming a rising public health problem in Nigeria. Coordinated efforts from various partners guided by one-health approach in the control and prevention of rabies should be prioritized at a wider scale in the country.

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### Introduction

Rabies, a neglected zoonosis, is without exception a lethal infectious disease often associated with the highest case fatality rate approaching 100% in exposed humans (Baghi *et al.*, 2016; Singh *et al.*, 2017). The majority of human rabies deaths occurring worldwide are results of dog bites (Elser *et al.*, 2018). In most parts of northern Nigeria, dogs are raised in houses, farms or left to roam freely on the street without being given proper vaccinations. They are often used for hunting, and also kept as shepherds- and security-guards. However, unvaccinated dogs straying in public places pose a risk of enhanced rabies transmission. Rabies prevention is being given less priority in public

health agendas in Nigeria. The majority of human and animal cases are not captured in the yearly health statistics, thus grossly underreported because most of the victims die at home without reaching out to appropriate healthcare centers. Dog bites investigations in a community encourage bite victims to seek appropriate medical care, thus allowing removal of rabid dogs and reducing potential exposures (Undurraga *et al.*, 2017). This report describes a case of dog bite that led to an eventual fatality, following clinical symptoms and palliative treatments given to the victim. It also highlights barriers to public health response to rabies outbreak in rural areas of Nigeria.

### Case Management

On 6th September, 2017, a woman from Jaddawa village in Birnin Magaji local government area of Zamfara State, Nigeria, aged 52 years was admitted to a hospital with clinical symptoms of agitation, confusion (evident in her contradicting statements) and dysphagia. The patient's family revealed that a stray dog had bitten the victim on the right palm on 7th July, 2017, which was treated at a local clinic by stitching the bite wound without offering any antirabies treatment. The bite wound was followed up with daily dressing until it healed completely. The attending physician at the hospital reviewed the case and as a result alerted the veterinarians based on the history of dog-bite and manifestation of clinical signs suspicious of rabies. A team of researchers was set up to further investigate the patient's details, which eventually made a presumption about a probable rabies exposure. As required by Nigeria's rabies surveillance system, dog bites victims are to report to veterinarians for assessment and recommendation of palliative care. Thus, suspected rabies exposures are further investigated to confirm clinical cases, and identify contact between rabid animals and subjects at risk (persons or animals). Investigators learned that the woman was bitten while fending off an aggressive dog that wanted to attack her sheep. Beside this occurrence, no further exposure with animals or humans linked to this incident has been identified. However, the dog was eventually killed and disposed off by the neighbors on the same day of the attack (7th July, 2017).

Follow up investigations revealed that the affected woman remained healthy after the bite wound had healed, until 28th August, 2017, when she begins to exhibit behavioral changes that necessitated her admission to a nearby village primary healthcare center. The victim did not receive timely and proper standardized post-exposure prophylaxis (PEP). Further details obtained from the case file in the facility showed that she manifested signs such as restlessness, groaning, vomiting and inappetence; and had earlier been treated for Malaria fever until 5th September, 2017. Having noticed the deterioration of her condition, she was transferred to an upgraded private hospital situated almost 37 kilometers away from the village and 61 kilometers more distant from the State's designated rabies exposure referral center. The medications administered at the hospital include Ketamine 2.5 mL stat (i.v), dextrose saline 1000 mL 8hourly/day (i.v) and Chlorpromazine 50 mg 12hourly/day (i.v).

Sadly, the patient died late at night on 7th September, 2017.

### Discussion

In view of the clinical signs manifested by the victim, history of bite by an unknown stray dog and incubation period of 2 months, this scenario was considered a probable case of human rabies. In line with the established classification of human rabies by world health organization (WHO) based on contact with animals, this case was classified as category III exposure involving transdermal bite wound with a broken skin. Rabies can be identified based on WHO clinical case definitions (i.e. history of dog bite and presence of typical symptoms progressing towards death within 7-10 days after the first sign), presenting in a person with a compatible illness that followed after contact with suspected rabid animal, thus these provide a strong suspicion of rabies (World Health Organization, 2013). Hence, this case can basically be classified as probable rabies. The recognized clinical signs and course of the illness in this case were similar to the previously reported exposures describing rabies in humans who died after being bitten by a suspected rabid dog (Wallace *et al.*, 2016; Tran *et al.*, 2018). Although the surveillance of rabies in humans has not been well carried out in Nigeria, the first documented rabies case in Zamfara State was detected in a sheep that had been bitten by an aggressive stray dog (Ahmad *et al.*, 2017). Almost all suspected human rabies deaths are diagnosed on clinical grounds across most of Africa, rarely laboratory confirmed due to the difficulties of collecting the required post-mortem samples (Suraweera *et al.*, 2012; Banyard *et al.*, 2013; Taylor *et al.*, 2017). Mortality in humans due to rabies infection are recorded low in Nigeria because of cultural beliefs, disease under-reporting, inadequate rabies diagnostic facilities, poor knowledge on the mode of transmission and prevention of the disease (Otolorin *et al.*, 2015).

After the victim was bitten, it took almost two months before the onset of clinical signs while death ensued within 10 days following the noticeable symptoms. The incubation period observed in this case is consistent with 1-3 months previously stated by the World Health Organization, and also coincides with the results of other studies (World Health Organization, 2013; Wallace *et al.*, 2016; Ahmad *et al.*, 2017; Qi *et al.*, 2018; Tran *et al.*, 2018). Preceding reports have indicated a shorter incubation period in cases with category III exposure site on the upper limb (Wallace *et al.*, 2016; Qi *et al.*, 2018). Bite on

the hands has been considered as one of the factors leading to a shorter eclipse period in rabies exposure, due to the decreased length to travel by the viral inoculum to reach the central nervous system and greater number of neurons (Singh *et al.*, 2017).

This incident occurred in a rural area at the peak of the farming season, during which outdoor activities of the farmers increased, leading to an enhanced chance of contact with the stray dog and potential exposure to rabies. Previous studies support this view, which showed that most human rabies-related deaths are being recorded from rural communities (Wallace *et al.*, 2016; Tarantola *et al.*, 2017; Qi *et al.*, 2018; Tran *et al.*, 2018). However, access to highly effective intervention such as timely PEP, has been considered challenging especially in rabies-endemic developing countries, where most exposures occur in rural areas (Tarantola *et al.*, 2017). In Africa, maximal number of human rabies deaths is documented amongst underprivileged agrarian people and children (Singh *et al.*, 2017). Financial obstacles associated with transportation to the authorized healthcare facility and treatment, absence of local medical unit and trained personnel have been identified as barriers to seeking medical care after a rabies exposure in remote areas (Tran *et al.*, 2018). Therefore, for better treatment of dog bites and surveillance of rabies, "rabies response centers" should be established in rural areas across Nigeria. Humans with encephalitic rabies can transmit the disease by biting other humans (Feder *et al.*, 2012). The control of rabies is complicated by limited coordination and communication between veterinary and public health officials in developing countries (Singh *et al.*, 2017). For leading control efforts, determining whether agriculture or health has responsibility often impedes initiation of rabies control plans (WHO, 2013).

Rabies is becoming a rising public health problem in Nigeria. Lack of effective control and preventive measures such as routine vaccinations in dogs and inefficient management of outbreaks are probably the attributing factors resulting in human cases. These can be achieved through adoption of One Health approach, by establishing a national coordination from medical and veterinary sectors among various partners. Thus, by mass dog vaccination campaign, prompt post-exposure management of humans bitten by dogs, continued surveillance of canine rabies outbreaks, and improving public enlightenment on the dangers posed by rabies. In order to reduce the risk of being

bitten by rabid dogs, selective depopulation aiming at reducing the number of stray dogs should be carried out on a wider scale in Nigeria.

Lack of confirmatory test to ascertain the infection in both the suspected rabid dog and human patient is no doubt the limitation of this study. However, lack of public awareness on the importance of preserving the suspected dog for clinical/laboratory examinations and the religious/cultural beliefs impeding postmortem examination in Nigeria averted effort to confirm the disease. Despite these limitations, this report provides information on human rabies that could serve as stimulus to improve on the timely dog-bites investigation and patient health-seeking behavior in the country.

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