



**REVIEW ARTICLE**

## A Narrative Review of the Knowledge, Attitudes, and Health-Seeking Practices to Human Rabies and Dog-Bite Injuries in Nigeria

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### Keywords

Dog-bite injuries,

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### ABSTRACT

**Background:** Human rabies is a zoonotic viral infection transmitted from infected carnivores to other humans through the bites and scratches of unvaccinated dogs. Due to inadequate public knowledge and awareness of the disease, it has persisted as a significant public health concern in Nigeria, especially in rural areas. This review paper summarizes the knowledge and attitudes toward rabies infection and health-seeking practices following dog bites or potential exposure to rabies in Nigeria.

**Methods:** This narrative review was conducted by reviewing information from peer-reviewed journals, case reports, and review articles published in the English language in PubMed, Google Scholar, and Scopus, using keywords such as ‘rabies in Nigeria,’ ‘knowledge, attitudes and practices towards rabies and dog bites,’ and ‘health-seeking practices to dog bites.’

**Results:** Several gaps in knowledge, attitudes, and health-seeking practices were identified; this poor knowledge and attitudes toward the infection in humans, as well as the health-seeking practices employed by most communities in response to dog bite injuries, are responsible for the continuous presence of human rabies in Nigeria.

**Conclusion:** We recommend public education, community engagement, and collaboration between healthcare facilities and communities to enforce vaccination laws for every dog in the community and report suspected cases of dog bite injuries to trained community healthcare workers equipped with proper protocols for admitting and handling victims of dog bite injuries.

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### INTRODUCTION

Human rabies is an acute infection that affects the central nervous system and results in fatal encephalomyelitis; the disease is established in humans by exposure to the rabies virus in the

salivary fluid of infected carnivores and bats through their bites and scratches.<sup>1,2</sup> The World Health Organization - WHO estimates that human rabies results in over 59,000 deaths

annually worldwide, with Africa and Asia bearing a disproportionate burden.<sup>3</sup>

Although the disease is highly preventable, most cases in developing communities have been due to bites from unvaccinated or roaming dogs and other reservoir hosts with unknown vaccination histories.<sup>4-8</sup> Hence, the disease has persisted as one of the prominent zoonotic illnesses in many developing countries, including Nigeria, because of the public health hazards it poses to both humans and animals.<sup>1,2,3,4,8,9</sup>

Since dog bites are the primary route of transmission from infected carnivores to humans, factors such as dog vaccination history, knowledge and awareness of the disease among humans, and health-seeking practices towards injuries inflicted by dogs can impact the course and magnitude of the disease in humans and also affect how individuals respond to and seek medical care. Comprehending the knowledge, attitudes, and health-seeking behaviors associated with rabies and dog bites is essential for formulating effective public health strategies. This narrative review explores peer-reviewed journals, case reports, and review articles on existing knowledge, attitudes, and some of the health-seeking practices towards rabies and dog bite injuries in Nigeria, emphasizing the need for improved public education, enhanced healthcare access, and community engagement to mitigate the impact of rabies and dog-bite injuries in Nigeria.

### **Epidemiology of Human Rabies and Dog-bite Injuries in Nigeria**

Since 1972, when the Lagos bat virus (LBV) and the Mokola virus (MOKV) were identified and isolated in both frugivorous bats (*Eidolon helium*) and shrews (*Crocidua* sp.) in southwest Nigeria and were reported to have caused rabies-like disease in two persons, several other cases of human rabies have been reported across the country.<sup>6,7,10-17</sup>

Although the exact number of cases is difficult to ascertain, estimates suggest that the national prevalence of rabies infection in animals has ranged from 3% to 28% between 1978 and 2020.<sup>5,7,18</sup> Between 1999 and 2019, out of 32 cases of human rabies published, about two-thirds were reported to occur in the northern region of Nigeria. However, some sporadic and undocumented reports archived in the Federal Ministry of Agriculture and Rural Development (FMARD) indicate that there is a steady increase in cases of human rabies nationwide.<sup>7,19</sup>

Interestingly, cases of human deaths due to rabies appear to be more concentrated in the southern parts of the country with mortality rates of between 4% to 27.3%, than in the northern states where there are more studies and reports of animal rabies.<sup>7,19</sup> Similarly, several studies have revealed a higher prevalence of the disease in rural and semi-urban areas where access to post-exposure prophylaxis (PEP) is limited compared to urban centers.<sup>4-9,20</sup>

The high incidence of human rabies has been partly linked to the vast population of stray and

unvaccinated dogs, as well as the lack of effective vaccination programs for domestic animals.<sup>5,6,20-23</sup> Although data on the population of unvaccinated dogs are quite sparse, anecdotal reports by victims of dog bites reported to both human and veterinary hospitals suggested that the incidence of dog bites is particularly higher in areas with large populations of stray and unvaccinated dogs.<sup>6,17,24</sup> Several studies have also confirmed the diagnosis of rabies and even reported human mortalities from dog bite injuries that were unprovoked and perpetrated by dogs without vaccination histories.<sup>6-7,10-12, 14-17</sup>

### **Knowledge and attitudes towards rabies and dog-bite injuries**

The knowledge and attitudes towards rabies and dog bite injuries in a community often provide a baseline for instituting public health intervention and developing effective control strategies.<sup>7,25</sup> In Nigeria, human rabies has long been associated with a sense of dread and alarm due to its high fatality rate.<sup>25,26</sup> This fear often leads to misconceptions and misinformation that prevent people from taking appropriate preventive measures or seeking timely medical attention following potential exposure.<sup>7</sup>

In Nigeria, dog bites are a significant public health issue, both as a direct risk factor for rabies and as a cause of other complications, including psychological trauma.<sup>4,8,26</sup> In most rural communities, many dog owners and individuals are unaware that the rabies virus can be essentially spread through the bite or scratch of an infected animal, particularly dogs. Hence,

there are no responsible dog ownership practices, such as keeping dogs securely confined, updating vaccination histories and avoiding interactions with stray or unknown animals.<sup>7,25,26</sup> Meanwhile, there is little or no vaccine coverage for dogs and PEP for humans at risk of dog bites in several communities across the country, and this is due to a combination of factors, including logistical challenges, limited resources, and inadequate public awareness which are major setbacks for rabies control.<sup>8,27</sup>

Al-Mustapha *et al.*<sup>28</sup> in a study among children under 15 years, revealed poor attitudes among their guardians and caregivers, as most dog bite injuries among these victims were treated as open wounds with analgesics and antibiotics. Adesola *et al.* also highlighted that in Nigeria, public awareness regarding rabies and the importance of obtaining medical assistance after a dog bite is frequently insufficient.<sup>29</sup> This lack of knowledge and negative attitudes towards rabies can have serious repercussions, as people may not identify the signs and symptoms of the disease in dogs, resulting in delays in taking necessary precautions and seeking timely medical treatment.<sup>21</sup> Individuals at risk frequently underestimate the seriousness of animal bites or scratches, leading to delays in seeking medical care. This failure increases the chances of rabies transmission and potential mortality.<sup>7,26</sup>

The consequences of inadequate knowledge about rabies are far-reaching because it diminishes understanding of the importance of routine vaccination in dogs against rabies, so

individuals and communities are unable to manage the disease among dog populations. The lack of adequate knowledge of the disease also results in irresponsible dog ownership and practices that perpetuate the presence of stray or roaming dogs, thus increasing the likelihood of transmission to humans.<sup>5,30,31</sup>

### **Health-seeking practices towards rabies and dog bite injuries**

According to the World Health Organization, rabies is almost always fatal once symptoms appear, highlighting the critical importance of prompt treatment following potential exposure (including dog bite injuries). Standard safety practices regarding rabies and dog bite injuries dictate that each potential contact with bites from dogs or any other carnivores must be assessed and evaluated by an attending health officer who can provide first aid to victims and give medical advice regarding the possible need for prevention.

In Nigeria, however, a high proportion of dog bite cases are home-managed by family/friends of victims who often do not comply with the requisite first-aid procedures and these cases were never taken to a health facility.<sup>8,28,30</sup> Several studies reported the use of several traditional treatment options involving the application of chili peppers, herbs, and certain concoctions.<sup>5,7,18,28;30;33,34-38</sup> Other traditional practices by victims of dog bites include the use of “holy water,”<sup>39</sup> eating the dog's abdomen,<sup>38</sup> eating the dog's liver and placing the hair from the dog on the bite wound.<sup>5</sup>

Further studies have shown that less than 50% of dog owners have their dog's vaccination records updated and that dogs raised for breeding and security purposes in urban areas were vaccinated more than those raised for other purposes, especially in rural communities.<sup>8,33,40</sup> These various cultural beliefs and practices often influence the management of dog bite injuries and the spread of the disease by delaying the administration of PEP and increasing the risk of rabies.<sup>27,39</sup>

### **CONCLUSIONS AND RECOMMENDATIONS**

Public health campaigns and community outreach programs are critical components of rabies control, especially among rural communities; this would involve raising awareness about the risks of rabies, the importance of vaccinating pets, and the need for prompt medical care for dog bite injuries. Limited access to healthcare facilities and PEP by individuals who are bitten by potentially rabid dogs to receive timely treatment can lead to a higher risk of developing rabies; it is, therefore, imperative to expand access to healthcare facilities in rural communities and ensure the availability of PEP for managing rabies cases.

We recommend collaboration between healthcare facilities, animal control agencies, and local communities to implement effective animal control measures to reduce the stray dog population. Also, it is essential to enforce vaccination laws for every dog in the community and report suspected cases of dog bite injuries to

community healthcare workers trained and equipped with proper protocols for admitting and handling victims of dog bite injuries.

Conflict of interest: None

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