

# Knowledge, Attitude and Practice of Rabies in and Around Lafia Metropolis, Nigeria

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**Abstract:** Rabies is endemic in Nigeria and other developing countries, killing 55,000 people annually. This descriptive cross-sectional study assessed the knowledge, attitudes and practices of rabies in and around Lafia, Central Nigeria. Semi-structured questionnaires were administered to 200 consenting respondents from urban and sub-urban areas in Lafia. Of the 200 respondents, 76.5% heard of rabies with 89% and 64% from urban and sub-urban areas. There was no significant difference on the awareness of rabies among respondents from urban and sub-urban areas ( $P>0.05$ ). Although there was misperception about the cause of rabies, 41% of the respondents indicated that it can be transmitted through dog bite and contact with open wound, as 36.5% were aware that human and other domestic animals can be affected by rabies. Sudden change in behavior was the obvious clinical manifestation after dog bite as asserted by 42.5% of the respondents. Majority (54.0%) of the respondents will seek post-exposure prophylaxis after dog bite, 18.5% will seek traditional treatment, 16.5% both the later and the former while 11.0% will not take any measure. However, 77.5% of the respondents indicated that legs were the commonest place of dog bite, 69.5% mentioned children as the most risky population. Only 14.0% and 18.5% of the respondents vaccinated their dog and were also vaccinated against rabies while 25.5% and 22.5% recorded the availability of both vaccines. After dog bite, 53.5% and 37.5% of the respondents will prefer to tie and kill the dogs, as 9.0% will take no action. Therefore, the need for rabies awareness programmes within the study area is vital. Rabies vaccines, immunoglobulin and facilities that administer them must become affordable and readily available locally for both dogs and humans.

**Keywords:** Attitude, Knowledge, Practice, Rabies, Vaccines

## 1. Introduction

Rabies is one of the oldest recognized infectious diseases which affects all mammals (Rupprecht *et al.*, 2002). The disease is caused by a rhabdovirus (Warrell and Warrell, 2004, Hankins and Rosekrans, 2004) and is transmitted to humans by animal bites, most usually domestic dogs (WHO, 1999). It is estimated that over 10 million people are exposed to rabies annually (Knobel *et al.*, 2005), with almost 100% case fatality rate (Ameh *et al.*, 2014). The disease remains a major socio-economic and public health problem in developing countries, claiming the lives of an estimated 55,000 people each year (Coleman *et al.*, 2004; Knobel *et al.*, 2005).

The disease is endemic in developing countries including

Nigeria and other parts of sub-Saharan Africa and Asia (Harry *et al.*, 1984; WHO, 2005) with heavy losses in human and livestock population and is often misdiagnosed, under-diagnosed and underreported (Adedeji *et al.*, 2010; Ehizibolo *et al.*, 2011). About 98% of human rabies deaths have been documented to have been caused by almost always bite of a rabid dog (Rupprecht, 2008). The annual cost of rabies in Africa and Asia was estimated at US\$ 583.5 million, most of which is due to the cost of post exposure prophylaxis (PEP) (Knobel *et al.*, 2005).

Although rabies has the highest case fatality rate of any disease known to man, the disease is preventable (Ertl, 2009, Lembo *et al.*, 2011). The high burden of rabies mortality in most developing countries suggests that, despite the existence of effective human and animal rabies vaccines, rabies

prevention and control efforts in these settings are inadequate (Sambo *et al.*, 2014). In Nigeria, it has not been possible to successfully control rabies, instead evidences show that the disease is on the increase (Ogunkoya, 1997).

Knowledge, attitudes and practices (KAP) studies have been widely used around the world for different applications in public health, based on the principle that increasing knowledge will result in changing attitudes and practices to minimize disease burden (Mascie-Taylor *et al.*, 2003). KAP surveys provide a suitable format to evaluate existing programmes and to identify effective strategies for behavior change (Koenraadt *et al.*, 2006). Many published studies demonstrate the influence of increasing community knowledge on the control and prevention of infectious diseases. The motivation behind this study was the need to provide baseline data that would allow the identification of knowledge gaps that may be affecting rabies control and prevention practices in study area.

Little or no information is available on the epidemiology of rabies in Lafia, Central Nigeria. The obvious presence of high population of dogs with poor management contributes to high endemicity of rabies in the study area. More so, dog meat is readily consumed and many dog meat processors and dog owners may not know about the devastating effects of rabies in humans and the potential risk of handling dogs. Thus, they may engage in some practices that may therefore expose them to the disease. This study was carried out to assess the knowledge, attitudes and practices (KAP) about rabies and associated factors among residents in Lafia, Central Nigeria.

## 2. Materials and Methods

### 2.1. Study Area and Population

The study was carried out in Lafia, the capital of Nasarawa State, located in Northcentral geopolitical zone of Nigeria. Lafia is densely populated with 330,712 inhabitants (Census, 2006). It is located on latitude 8° 28'N and longitude 8° 31'E (Hogben *et al.*, 2013), a sizable area characterized by poor drainage and sanitation with garbage dumps in close proximity to residential buildings. Hausa and English languages are most commonly spoken by all residents.

### 2.2. Study Design and Population

A community based cross sectional study was used to assess the knowledge, attitudes and practices of the community on rabies using semi structured questionnaire between January to October, 2015. The study populations were residents of Lafia metropolis and its surrounding.

### 2.3. Ethical Consideration

Informed consent was obtained from the respondents. They were made to understand that participation is voluntary and there was no consequence for non-participation. All information obtained was kept confidential.

### 2.4. Sampling and Survey Method

Two hundred (200) respondents were selected for this study using convenience sampling. Self-administered semi-structured questionnaires were used for data collection from consenting respondents. The questionnaires captured information on sociodemographic variables, knowledge, attitudes and practices regarding rabies.

## 3. Data Analysis

Information collected from the respondents were entered and analyzed with Statistical Package for Social Sciences version (SPSS) 15 software. Descriptive statistics were done and frequencies and proportions were used to summarize variables of interest.

## 4. Results

Table 1 shows the profiles of the respondents from the urban (100) and sub-urban (100) areas. Among the 200 respondents, 105 were male and 95 were females. Majority of the respondents' age groups included in the range of 21 – 25 and 16 – 20 years and 42.5% of the respondents have attended higher education. Most of the respondents are singles (64.5%), Christians (66.5%) and are involved in other forms of occupation (56%).

Table 2 shows the Knowledge of the respondents on rabies. About 1153 (76.5%) of the respondents were aware of the disease. Majority of the respondents 95 (47.5%) and 73 (36.5%) described virus as the cause of the disease and humans and other domestic animals as the species affected by rabies while 96 (48.0%) indicated that dog bite only is the mode of transmitting rabies. Among the 200 respondents, 85 (42.5%) asserted that sudden change in behaviour was the obvious clinical manifestation of rabies while 103 (51.5%) were aware that rabies can be preventable by vaccine. With regards to previous training/orientation on rabies, 31 (15.5%) had such training while 169 (84.5%) had none.

As indicated in table 3, 67 (33.5%) and 28 (14%) of the respondents indicated that they keep and vaccinated their dog(s), as only 51 (25.5%) reported the availability of dog vaccines. While 97 (48.5) kept their dog indoor, 103 (51.5%) left their dogs to move freely. Majority 163 (81.5%) of the respondents were never vaccinated against rabies, as only 45 (22.5%) reported the availability of human rabies vaccines. Children were the most vulnerable group at risk of the disease as reported by 139 (69.5%) while 155 (77.5%) indicated that leg is the frequent place of bite by dog. With regards to the action taken after been bitten by dog, 108 (54.0%) and 37 (18.5%) of the respondents will seek post-exposure vaccine and traditional treatment respectively while 33 (16.5%) will seek for both. Actions taken against the biting dog were to tie and kill them as indicated by 101 (53.5%) and 75 (37.5%) respondents while 24 (9.0%) respondents will do nothing.

**Table 1.** Sociodemographic Characteristics of Respondents.

Characteristic of Respondents	Number and Percentage of Respondents		
	Total (%) n = 200	Urban (%) n = 97	Sub-urban (%) n = 103
Sex			
Male	105 (52.5%)	52 (53.6%)	53 (51.5%)
Female	95 (47.5%)	45 (46.4%)	50 (48.5%)
Age group			
<15	20 (10%)	18 (18.6%)	2 (1.9%)
16-20	46 (23%)	24 (24.7%)	22 (21.4%)
21-25	60 (30%)	25 (25.8%)	35 (33.9%)
26-30	44 (22%)	18 (18.6%)	26 (25.2%)
31>	30 (15%)	12 (12.4%)	18 (17.5%)
Level of Education			
Cannot read and write	11 (5.5%)	3 (3.1%)	7 (6.8%)
Informal (read and write only)	28 (14%)	15 (15.5%)	11 (10.7%)
Primary school	23 (11.5%)	16 (16.5%)	7 (6.8%)
Secondary school	53 (26.5%)	24 (24.7%)	29 (28.2%)
Higher education	85 (42.5%)	39 (40.2%)	49 (47.6%)
Occupation			
Health professional	5 (2.5%)	1 (1.0%)	4 (3.9%)
Veterinarian	4 (2.0%)	1 (1.0%)	3 (2.9%)
Farmer	14 (7.0%)	6 (6.2%)	8 (7.8%)
Jobless	22 (11.0%)	16 (16.5%)	6 (5.8%)
Others	155 (56.0%)	73 (75.3%)	82 (79.6%)
Marital status			
Single	129 (64.5%)	68 (70.1%)	61 (59.2%)
Married	62 (31%)	23 (23.7%)	39 (37.9%)
Divorced	9 (4.5%)	6 (6.2%)	3 (2.9%)
Religion			
Christian	133 (66.5%)	81 (83.5%)	52 (50.5%)
Muslim	52 (26%)	8 (8.3%)	44 (42.7%)
Pagan	10 (5%)	5 (5.2%)	5 (4.9%)
Others	5 (2.5%)	3 (3.1%)	2 (1.9%)

**Table 2.** Knowledge of the Respondents on Rabies.

Parameter	Number and Percentage of Respondents		
	Total (%) n = 200	Urban (%) n = 100	Sub-urban (%) n = 100
Awareness of Rabies			
Yes	153 (76.5%)	89 (89.0%)	64 (64.0%)
No	47 (23.5%)	11 (11.0%)	36 (36.0%)
Cause of Rabies			
Virus	95 (47.5%)	65 (65.0%)	30 (30.0%)
Bacterium	23 (11.5%)	13 (13.0%)	10 (10.0%)
Starvation and thirst	20 (10.0%)	10 (10.0%)	10 (10.0%)
I don't know	62 (31.0%)	12 (12.0%)	50 (50.0%)
Species affected by Rabies			
Dogs only	62 (31.0%)	34 (34.0%)	28 (28.0%)
Human only	22 (11.0%)	05 (05.0%)	17 (17.0%)
Dog and human	43 (21.5%)	22 (22.0%)	21 (21.0%)
Human and other domestic animals	73 (36.5%)	39 (39.0%)	34 (34.0%)
Means of transmission			
Bite only	74 (37.0%)	22 (22.0%)	52 (52.0%)
Contact with saliva only	19 (9.5%)	18 (18.0%)	01 (01.0%)
Bite and contact with open wounds	82 (41.0%)	49 (49.0%)	33 (33.0%)
Infected meat and others	25 (12.5%)	11 (11.0%)	14 (14.0%)
Animal species that transmit Rabies virus to human			
Dog only	96 (48.0%)	42 (42.0%)	54 (54.0%)
Dog and cat only	22 (11.0%)	05 (05.0%)	17 (17.0%)
Bat, dog and cat	55 (27.5%)	44 (44.0%)	11 (11.0%)
Other domestic animals	27 (13.5%)	09 (09.0%)	18 (18.0%)
Signs and symptoms			
Salivation only	34 (17.0%)	23 (23.0%)	11 (11.0%)
Sudden change in behavior	85 (42.5%)	36 (36.0%)	49 (49.0%)
Pain at bite site	57 (28.5%)	27 (27.0%)	30 (30.0%)
Loss of appetite only	24 (12.0%)	14 (14.0%)	10 (10.0%)
Knows that rabies could be prevented by vaccine			

Parameter	Number and Percentage of Respondents		
	Total (%) n = 200	Urban (%) n = 100	Sub-urban (%) n = 100
Yes	103 (51.5%)	79 (79.0%)	24 (24.0%)
No	97 (48.5%)	21 (21.0%)	76 (76.0%)
Receives information about rabies prevention and vaccination from			
Health worker	41 (20.5%)	23 (23.0%)	18 (18.0%)
Television	19 (9.5%)	14 (11.0%)	05 (05.0%)
Radio	11 (5.5%)	06 (06.0%)	05 (05.0%)
Livestock officers	56 (28.0%)	28 (28.0%)	28 (28.0%)
Others	73 (36.5%)	29 (29.0%)	44 (44.0%)
Knows that rabies vaccine could be obtain from			
PHC/ General Hospital	05 (2.5%)	02 (02.0%)	03 (03.0%)
Private hospitals/Pharmacy	18 (09.0%)	11 (11.0%)	07 (07.0%)
Teaching/Specialist Hospitals	65 (32.5%)	39 (39.0%)	26 (26.0%)
Research institutes	50 (25.0%)	31 (31.0%)	19 (19.0%)
Livestock Departments	62 (31.0%)	25 (25.0%)	37 (37.0%)
Training/Orientation on Rabies			
Yes	31 (15.5%)	26 (26.0%)	05 (9.0%)
No	169 (84.5%)	74 (74.0%)	95 (91.0%)

Table 3. Attitudes and Practices of Respondents.

Parameter	Number and Percentage of Respondents		
	Total (%) n = 200	Urban (%) n = 100	Sub-urban (%) n = 100
Action against biting dog			
Tie them	101 (53.5%)	53 (53.0%)	48 (48.0%)
Kill them	75 (37.5%)	34 (34.0%)	41 (41.0%)
Do nothing	24 (9.0%)	13 (13.0%)	11 (11.0%)
Action for bitten man			
Post-exposure vaccine	108 (54.0%)	64 (50.5%)	44 (57.3%)
Traditional treatment	37 (18.5%)	16 (22.7%)	21 (14.6%)
Both	33 (16.5%)	13 (13.4%)	20 (19.4%)
None of the above	22 (11.0%)	07 (13.4%)	15 (8.7%)
Action for bitten animal			
Kill them	80 (40.0%)	37 (37.0%)	43 (43.0%)
Tie them	31 (15.5%)	21 (21.0%)	10 (10.0%)
No action taken	89 (44.5%)	42 (42.0%)	47 (47.0%)
Do you keep dogs?			
Yes	67 (33.5%)	41 (41.0%)	26 (26.0%)
No	133 (66.5%)	59 (59.0%)	74 (74.0%)
Do you vaccinate your dogs?			
Yes	28 (14.0%)	17 (17.0%)	11 (11.0%)
No	39 (19.5%)	24 (24.0%)	15 (15.0%)
No answer	133 (66.5%)	59 (59.0%)	74 (74.0%)
Availability of vaccine for dog			
Yes always	51 (25.5%)	41 (41.0%)	10 (10.0%)
Sometimes	85 (42.5%)	42 (42.0%)	43 (43.0%)
Not available	64 (32.0%)	17 (17.0%)	47 (47.0%)
Have you ever been vaccinated against rabies			
Yes	37 (18.5%)	22 (15.46%)	15 (21.4%)
No	163 (81.5%)	78 (84.54%)	85 (78.64%)
Availability of vaccine for human			
Yes always	45 (22.5%)	32 (32.0%)	13 (13.0%)
Sometimes	100 (50%)	57 (57.0%)	43 (43.0%)
Not available	55 (27.5%)	11 (11.0%)	44 (44.0%)
Most risky population			
Children	139 (69.5%)	66 (66.0%)	73 (73.0%)
Young people	33 (16.5%)	15 (15.0%)	18 (18.0%)
Older people	28 (14.0%)	19 (19.0%)	09 (09.0%)
Dog management practices			
Left free	103 (51.5%)	42 (42.0%)	61 (61.0%)
Kept indoor	97 (48.5%)	58 (58.0%)	39 (39%)
Is there specialized hospital for rabies			
Yes	20 (10.0%)	14 (14.0%)	6 (6.0%)
No	180 (90.0%)	83 (83.0%)	97 (97.0%)
Frequent place of bite			
Leg	155 (77.5%)	69 (69.0%)	86 (86.0%)
Head	15 (7.5%)	9 (9.0%)	6 (6.0%)

Parameter	Number and Percentage of Respondents		
	Total (%) n = 200	Urban (%) n = 100	Sub-urban (%) n = 100
Hand	12 (6.0)	7 (7.0)	5 (5.0)
Body	18 (9.0)	12 (12.0)	6 (6.0)

## 5. Discussion

The results of our findings indicate that 76.5% of the respondents have heard about rabies from different sources, with 89.0% and 64.0% from urban and sub-urban areas respectively. The level of awareness obtained from this study is in consonance with the findings of Ichhupujani *et al.* (2006), Matibag *et al.* (2007), Ali *et al.* (2013) and Sumon *et al.* (2016) who obtained 68.7%, 78.7%, 75.2% and 73.0% from India, Sri Lanka, Ethiopia and Bangladesh. However, higher proportions of 96.0%, 96.4%, 99.0% and 99.0% were reported by Sambo *et al.* 2014, (in Tanzania), Shumuye *et al.*, 2014 (in Ethiopia), Tadesse *et al.* 2014, (in Ethiopia) and Moran *et al.* 2015, (in Guatemala). The high level of awareness of rabies among the participants as recorded in this study may be due to the endemicity of rabies and frequent reports of rabies incidence in and around Lafia, and the availability of information from various sources. Respondents from the urban area were more aware (89.0%) of rabies than those from the sub-urban (64.0%). This may be attributed to the easy and constant access to health information by the urban dwellers from different sources. More so, they are more enlightened and have direct access to health care facilities. The current results also indicated that the respondents were informed about rabies from health workers, television, radio and livestock officers which suggests that the mass media and health/livestock workers could work harder to disseminate rabies relevant information.

Only 47.5% of the respondents knew the actual cause of rabies. Other respondents believed that the disease in dogs is caused by bacteria, starvation and thirst while others don't know. In a study in Ethiopia, only 18% of the respondents knew that rabies is caused by virus (Shumuye *et al.*, 2014). This could be due to the difference in community awareness in the study areas. This misunderstanding could probably be explained by the opinion of asymptomatic rabies carrier dogs in which stressors like starvation and thirst might induce the development of clinical rabies in these carrier dogs. But the idea of asymptomatic rabies carrier dogs by itself is a controversial issue (Wilde *et al.*, 2009), and the association of stressors to the development of clinical rabies might be an implausible claim. About 48.0% of the respondents reported that dogs most frequently transmit the infection to humans. Very few respondents knew that rabies could be transmitted by species other than domestic dogs. This is consistent with findings from a survey in Thailand which found that only 16% of participants knew that all mammals can suffer from rabies (Kongkaew *et al.*, 2004). Furthermore, domestic dogs have been reservoir of rabies and a source of rabies infection to humans and other animals (John, 2005; Joo *et al.*, 2011). In many parts of the world, especially Africa and Asia, 85-

90% of human rabies cases were been caused by dog bite (Tang *et al.*, 2005; Fitzpatrick *et al.*, 2012).

Majority (51.5%) of the respondents believed that rabies could be prevented by vaccine. This is in agreement with the finding of Lai *et al.* 2005, which reported that 49.2% respondents held true the prevention of rabies by vaccine. Mass dog vaccination is the most effective measure to control rabies and prevent human deaths (Bogel, 1987). While the majority of respondents knew of the need for dog vaccination, and were willing to vaccinate their dogs, only 14.0% reported to have previously vaccinated their dogs, which reflects a lack of rabies control programmes. Indeed, most respondents reported that dog vaccines in the study area are not regularly available. Lower rate of dog vaccination was also recorded by Abraham *et al.* 2013, and Lai *et al.* 2005. It is commonly perceived that many African communities are characterised by low levels of responsible dog ownership. Indeed, in this study 51.5% respondents left their dogs to move freely without restrain. This indicates the presence of high risk of rabies. The practice of allowing dogs to roam freely would facilitate the spread of rabies in the animal population and would make rabies a continuing zoonotic threat to humans. Also, only 18.5% of respondents were once vaccinated against rabies, as 50.0% and 27.5% reported that the vaccines are seldom and never available. This shows that vast majority of individuals in the study area are at risk of rabies when bitten by rabid animal.

Most of the respondents (69.5%) reported that children are the most risky population to the disease. Other studies have found that children and young people were the most vulnerable group for animal bites (Knobel *et al.*, 2005; Sriaroon *et al.*, 2006; Dodet *et al.*, 2008; Shumuye *et al.*, 2014). The reason for this vulnerability is likely their countenance of natural affection for animals, particularly cats and dogs. Sometimes bites may take place with provocation from children like stone throwing, beating, chasing or running at the sight of the dogs. In addition, Assefa *et al.* (2010) has reported that elders are well aware of the danger of rabies and look for medical care than children.

Although more than half of the respondents (54.0%) will go for post exposure prophylaxis after being bitten by dogs, 18.5% will prefer the traditional treatment while 16.5% will do both the later and the former. These results are consistent with studies in other countries where people would seek traditional practices instead of modern post-exposure prophylaxis treatment (Sekhon *et al.*, 2002; Sudarshan *et al.*, 2007; Rumana *et al.*, 2013). These types of treatment seeking behaviour may be the outcome of persisting many myths and false beliefs among the respondents associated with dog bite management and a lack of education regarding effective prevention of rabies. Furthermore, socioeconomic conditions (low level of education, financial constraints), insufficient

vaccine and immunoglobulin supply to the government hospitals, distance from the dog bite victims place of residence to the government hospitals may be responsible for the low vaccine coverage among dog bite victims in the study area. The World Health Organization (WHO) recommends wound washing and vaccination immediately after contact with a suspect rabid animal which can prevent almost 100% of rabies deaths (WHO, 2015).

Findings from this study revealed that most of the respondents (77.5%) recorded that leg is the frequent place of bite by dogs. Defensive aggression is likely a major contributing factor to dog bites. Bites to the legs and feet of humans may be correlated to territory protection by dogs (Isek, 2013). The occurrence of dog bites mostly on the legs may be due to proximity of this part of the body to the animal. Also, it is likely that victims would have used legs in an attempt to separate fighting dogs or defending themselves against dog attacks resulting in more bites on the lower extremities.

In this study, we found that the attitudes of the respondents towards biting dog were negative. Most of the respondents preferred to tie and kill the dog so as to prevent such attacks to others. It is definitely not a good practice as many dogs may not be suffering from rabies. Similar practice was also reported by Dhaliwal *et al.* 2000. A study in India also reported that 43% of the respondents felt that killing excess and suspected aggressive dogs is the best method for controlling rabies within the stray dog population (Herbert *et al.*, 2012). Furthermore, 84.5% of the respondents had no previous training/orientation on rabies. This illustrates that training on rabies related aspects has not been given at community level. Therefore, public extensive education about rabies should be given to community to increase their awareness. Raising community awareness level has been mentioned as important tool to control rabies by many scholars (Eshetu *at al.*, 2002; Wudu *et al.*, 2013). But building awareness is generally thought to be the first step to control rabies. To enhance rabies awareness, first of all, it is necessary to use information and education campaigns throughout the country and school-based rabies control programmes should be implemented thereafter. Veterinarians and physicians can play a crucial role in controlling rabies through a one-health approach by linking animal and human health (Sumon *et al.*, 2016). Also, participatory epidemiology approach can be used for community involvement in rabies control and prevention.

## 6. Conclusion

Although respondents showed high level of knowledge and awareness regarding rabies in the study area, there are some KAP gaps regarding the cause of rabies, animals affected, modes of transmission, actions taken after suspected animal bite, poor treatment seeking behaviour, and inability to access community health facilities for rabies treatment and/or prophylaxis. This indicates the existence of high risk of the disease which poses a health hazard and makes

difficult the control of rabies in the study area. Therefore, the need for rabies awareness programmes within the community is vital. Rabies vaccines, immunoglobulin and facilities that administer them must become affordable and readily available locally for both dogs and humans. Awareness about rabies can be increased by undertaking targeted awareness campaigns using the mass media. This is achievable by initiatives both by the government and non-government organisations.

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