



Assessment of the Knowledge, Attitude and Practices of Dog Owners on Rabies in Ilorin, Kwara State, Nigeria

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ABSTRACT

Rabies is an acute viral zoonotic disease that affects all warm-blooded animals. Its constant evaluation of the perception of the public is essential. This study assessed the knowledge, attitude and practices of dog owners on rabies in Ilorin, Kwara State, Nigeria. This was achieved by administering 150 structured questionnaires to dog owners, breeders and hunters in the study area using face to face interviews. The data collected were analysed using SPSS version 21. Dog owners with more than 3 dogs (13.3%) and those with one dog (50.7%) had the highest (80%) and least (47.4%) rabies vaccination rates respectively. Dogs kept for both breeding and security (18%) were vaccinated more than those kept for (74.1%) other reasons. Lhasa apso and local breeds were the highest (100%) and least (14.3%) vaccinated dogs in the study. Dogs < 1 year (30.7%) and those > 6 years (0.7%) recorded (65.2%) and (0%) current rabies vaccination status respectively, while 90% and 72.6% of the respondents knew about rabies and its transmission to man respectively, only 58.7% had updated rabies vaccination for their dogs. Although 56% of the dog owners in this study rightly indicated how rabies is transmitted, 16% and 64.7% didn't know how humans contract the disease and the clinical presentations in dogs respectively. Most (35.6%) respondents that didn't have up to date vaccinations for their dogs didn't have cogent reasons for failing to do so. Dog owners that were not knowledgeable about pre-exposure rabies vaccination were 58.7% while only 7.3 % of them had received previous shots of the vaccine. Dog bite experience was recorded in 78% of the respondents while only 20.7% of the 82.7% that claimed to know what to do when bitten by a dog identified the right course of action. Most (69.3%) respondents however indicated they would seek medical help at the government hospital (40%) if bitten by a rabid dog. The result of this study showed that there is some knowledge gap in the knowledge of rabies among stakeholders in the study area. Periodic mass rabies awareness campaigns to improve the perception of the disease in the study area is indicated.

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INTRODUCTION

Rabies is a vaccine-preventable, viral, zoonotic disease that affects mammals in various parts of the world (Daodu and Oluwayelu, 2016). Rabies is caused by rabies virus, a neurotropic organism belonging to the family Rhabdoviridae and genus Lyssavirus (WHO, 2016). Rabies causes fatal encephalomyelitis and results in death if not attended to (Lembo et al., 2006, Daodu and Oluwayelu, 2016). Mammals such as jackal, fox, wolf, skunk, raccoon, bat and dog act as reservoir-hosts of rabies virus and transmit it to other animals (Aiyedun et al., 2017,

Edukugho et al., 2018). The most prevalent mode of infection is through the bite of a rabid animal, however other modes of transmission such as organ transplantation and aerosol are also possible (WHO, 2013, OIE, 2017).

Preventive vaccination against rabies virus is a very effective method for preventing the disease (Adedeji et al., 2010; Aiyedun et al., 2021). Pre and post-exposure vaccinations against the virus have existed for a long period of time to protect humans, particularly those who are occupationally exposed, such as those who work in rabies laboratories,

veterinary hospitals/clinics, wildlife rehabilitation facilities and animal shelters (Aiyedun *et al.*, 2017). According to the Advisory Committee on Immunization Practices, the importance of receiving this vaccination, particularly rabies pre-exposure vaccination, is more important in endemic nations (Daodu *et al.*, 2017).

The disease occurs regularly in the dog accounting for about 94% of the confirmed diagnosed cases. Reported cases of rabies in humans in Nigeria are low; this could be attributed to poor reporting of cases, cultural beliefs, mis-diagnosis of the disease and poor knowledge on the mode of transmission and prevention of the disease (Chernet and Nejash, 2016, Awoyomi *et al.*, 2021).

This neglected tropical disease is underfunded, underdiagnosed and underreported in Nigeria (Ehizibolo *et al.*, 2011; Ojo *et al.*, 2016; Elelu *et al.*, 2019). To reduce the incidence of dog-bites and prevent dog-mediated human rabies, it is essential to assess the awareness level and further educate the general public. This has proved effective in changing the risk perception of the populace and resulted in attitudinal changes that were necessary to reduce the burden of rabies (Edukugho *et al.*, 2018). Challenges such as poor awareness and knowledge of rabies, lack of political will, shortage of vaccines and other vaccine-related factors had led to the endemicity of rabies and significant under-reporting of rabies in Nigeria (Ajayi *et al.*, 2006). This study evaluated the knowledge, attitude and practices of dog owners on rabies in Ilorin, Nigeria.

MATERIALS AND METHODS

Study location and participants selection:

The study was conducted in urban, semi urban and rural communities spread across four local government areas (Ilorin South, Ilorin west, Ilorin East and Moro Local government areas) of Kwara State. Only dog owners and managers were selected to participate in the study.

Questionnaire:

A pre-tested structured questionnaire was administered to dog owners through face-to-face interview between October, 2021 to February, 2022. The interview was conducted at University of Ilorin Veterinary Teaching Hospital, Aromokeye Veterinary Clinic, Kwara State Zonal Veterinary Clinic and Sabo-Oke areas of Ilorin. Additionally, questionnaire was administered to hunters who use dogs for hunting in the semi urban and rural communities of Kwara State. The questionnaire assessed knowledge, attitude and practise of dog owners in relation to vaccination of their dogs against rabies and other vaccine preventable diseases

Statistical Analysis:

Data obtained were manually entered into a Microsoft Excel and imported into Statistical Package for Social Science (SPSS) software v. 21 for analysis. Descriptive and inferential statistical analysis was performed. Descriptive analysis was presented in frequency and percentage while inferential test was conducted using Fisher's exact test to compare association. Test of association was identified as significant when p value is <0.05.

RESULTS

Prevalence of *Salmonella* in Suya in Ilorin:

Out of 102 samples of Suya that were collected from the fifteen (15) locations in Ilorin, Kwara state, Nigeria, 5 (4.9%) were positive for *Salmonella*. The organism was isolated from four Suya stands and their prevalence were 1 (20%), 1 (20%), 1 (20%), and 2 (40%) for Tipper Garage/Unilorin PS, Zamfara Hostel, Sabo-Oke and Sabo-Oke/Maraba Junction respectively (Table 1)

Table 1: Socio-demographic characteristics of the dog owners:

Feature	Freq. (%)
Age of respondents (years)	
6-15	4 (2.7)
16-25	49 (32.7)
26-35	51 (34.0)
36-45	24 (16.0)
46-55	8 (5.3)
>55	14 (9.3)
Gender	
Male	109 (72.7)
Female	41 (27.3)
Educational level	
No formal education	1 (0.7)
Primary	4 (2.7)
Secondary	28 (18.7)
Degree/ HND	95 (63.3)
Post graduate	22 (14.7)
Marital status	
Single	79 (52.7)
Married	70 (46.7)
Divorce	1 (0.7)
Occupation	
Civil servant	48 (32.0)
Private worker	51 (34.0)
Hunter	19 (12.7)
Student	32 (21.3)
Religion	
Christianity	77 (51.3)
Islam	71 (47.3)
No religion	2 (1.3)

The results showed that 50.7% (76/150) of the respondents owned a dog each while only 13.3% (20/150) had more than three dogs. (Table 2). Dog owners with more than three dogs had the highest rabies vaccination rate (80.0%, 16/20) while the least occurred among owners with one dog (47.4%, 36/76) (Table 2). People keeping more than one dog were two to four times more likely to have their dogs vaccinated with anti-rabies as compared with those who had just one ($p \leq 0.033$) (Table 2). Dogs were mainly kept for security (52%, 78/150), breeding/security (18.0%, 27/150) and breeding purposes only (15.3%, 23/150), although some respondents still kept them for hunting (6.7%, 10/150) and as pet animals (4.6%, 7/150).

Table 2: Socio-demographic characteristics of dogs owned by respondents:

Features	Freq (%)	No. of vaccinated dogs (%)	OR (95%CI)	P-value
No of dogs owned				
1	76 (50.7)	36 (47.4)	1	
2-3	54 (36)	36 (66.7)	2.2 (1.1 – 4.6)	0.0330*
>3	20 (13.3)	16 (80.0)	4.4 (1.4 – 14.5)	0.0114*
Purpose for keeping dog				
Security	78 (52.0)	50 (64.1)	16.1 (1.9 – 133.6)	0.0015*
Breeding	23 (15.3)	17 (73.9)	25.5 (2.6 – 246.0)	0.0015*
Breeding and security	27 (18)	20 (74.1)	25.7 (2.7 – 241.2)	0.0007*
Hunting	10 (6.7)	1 (10.0)	1	
Pet	7 (4.6)	0 (0.0)	0.4 (0.0 – 11.9)	1.0000
Others	5 (3.3)	0 (0.0)	0.6 (0.0 – 16.7)	1.0000
Breed of dog(s)				
German shepherd	60 (40.0)	38 (63.3)	10.4 (3.5 -30.6)	<0.0001*
Lhasa apso	6 (4.0)	6 (100.0)	72.1 (3.5 – 1473)	0.0001*
Rottweiler	21 (14.0)	17 (81.0)	25.5 (6.0 – 108.0)	< 0.0001*
Local breed	35 (23.30)	5 (14.3)	1	
Caucasian	8 (5.3)	6 (75.0)	18.0 (2.8 – 115.6)	0.0017*
Boerboel	7 (4.7)	7 (100.0)	83.2 (4.1 – 1677)	< 0.0001*
Dobberman	2 (1.3)	1 (50.0)	6.0 (0.3 – 112.3)	0.3018
English eskimo	8 (5.3)	6 (75.0)	18.0 (2.8 – 115.6)	0.0017*
Others (foreign breed)	3 (2.0)	2 (100.0)	12.0 (0.9 – 158.5)	0.0813
Age of dog				
<1	46 (30.7)	30 (65.2)	6.9 (1.7 – 23.3)	0.0056*
1-3	89 (59.3)	55 (61.8)	5.9 (1.5 – 22.8)	0.0075*
4-6	14 (9.3)	3 (21.4)	1	
>6	1 (0.7)	0 (0.0)	1.1 (0.0 – 33.4)	1.0000
How did you get the dog(s)?				
Gift	32 (21.3)	21 (65.6)	1.4 (0.6 – 3.2)	0.5424
Bought	116 (77.3)	67 (57.8)	1	
Found	2 (1.3)	0 (0.0)	0.15 (0.0 – 3.1)	0.1467

Key: Freq- Frequency OR- Odds ratio 95%CI- 95% confidence interval *Significant at $p < 0.005$

However, dogs kept for breeding/security purpose (74.1%, 20/27) had the highest rabies vaccination rank followed by breeding dogs (73.9%, 17/150) and security dogs (64.1%, 50/150). The rabies vaccination of dogs kept for breeding, security or both had higher significant difference when compared with those kept for hunting purposes ($p \leq 0.0015$). Among the dog breeds kept by dog owners, German shepherd was highest (40.0, 60/150) followed by indigenous (local) breeds (23.3%, 35/150). However, it was observed that foreign breeds of dogs such as lhasa apso, boerboel, rottweiler, caucasian and english eskimo had $\geq 75\%$ current rabies vaccination coverage while the least vaccinated breed are indigenous local dogs (14.3%, 5/35). Our analysis further indicated high significant differences when current rabies vaccination in lhasa apso, boerboel, rottweiler, caucasian and english eskimo and german shepherd breed of dogs were compared individually to that in Nigerian local dogs ($p \leq 0.0017$) (Table 2). Most (59.3%, 89/150) of the dogs kept by the dog owners were within 1- 3 years old. However, dogs <1 year old had the highest (65.2%, 30/46) current rabies vaccination while dogs >6 years old were not vaccinated. Univariate analysis further indicated high significant differences in rabies vaccination of dogs aged <1 year old and 1-3 years old as compared individually with those that were within 4-6 years of age ($p \leq 0.0075$) (Table 2). Most of the dogs kept by the study participants were mostly bought (77.3%, 116/150) or given as gift (21.3%, 32/150) but some were stray dogs that were adopted (1.3%, 2/150). Additionally, we

observed that dogs given as gift had highest current rabies vaccination rank (65.6%, 21/150) followed by those purchased (57.8%, 67/116) while none of the adopted dogs were vaccinated against rabies (Table 2).

Although a large proportion of dog owners had heard about rabies (90.0%, 135/150) and its possible transmission to humans (72.6%, 109/150), only 58.7% (55/150) of the dog owners had updated rabies vaccination for their dogs (Table 3).

Table 3: Assessment of knowledge on Rabies

Features	Freq. (%)
Have you heard of rabies?	
Yes	135 (90.0)
No	15 (10.0)
Do you know rabies can be transmitted from dogs to humans?	
Yes	109 (72.6)
No	41 (27.3)
Do you know it can be transmitted by	
Bite	84 (56.0)
Scratch	21 (14.0)
Open wound	6 (4.0)
Bite and scratch	2 (1.3)
Bite and open wound	5 (3.3)
Bite, scratch and open wound	8 (5.3)
I don't know	24 (16.0)
Do you know how rabies is presented in an infected dog?	
Yes	53 (35.3)
No	97 (64.7)
Are you aware of rabies vaccination in dogs?	
Yes	119 (79.3)
No	31 (20.7)
Is your dog's anti-rabies vaccination current (within one year)?	
Yes	88 (58.7)
No	62 (41.3)
^a Why haven't you vaccinated your dog (s)?	
I have no reason	21 (35.6)
Did not know about it	19 (32.2)
Expensive	6 (10.1)
Vaccination point is too far	5 (8.5)
I don't know any veterinarian	4 (6.8)
Couldn't catch the dog	4 (6.8)
^b Are you aware of the zoonotic danger posed by a non-vaccinated dog?	
Yes	22 (37.3)
No	37 (62.7)
Do you know about human vaccination against rabies?	
Yes	62 (41.3)
No	88 (58.7)
Have you been vaccinated against rabies?	
Yes	11 (7.3)
No	51 (92.7)

Key: ^a This question was a follow up of preceding question ^b Calculation was based on only those who responded

Although several dog owners were aware that rabies can be transmitted to humans from infected dogs through bite (56%, 84/150), scratch (14%, 21/150) and open wound (4%, 6/150) however, 16.0% (24/150) of the dog owners didn't know how humans can contract it while 64.7% (97/150) of them didn't know clinical presentations of a rabid dog. Additionally, the knowledge of vaccination of dog against rabies was high (79.3%, 119/150), yet only 58.7% (88/150) had up to date vaccination for their dogs. Dog owners without up-to-date rabies vaccination of their dogs claimed no reason for not having done so (35.6%, 21/59) while 32.2% (19/59) of

the respondents claimed they didn't know about the vaccination. However, several other responses included high cost of vaccination (10.1%) and far distance of veterinary clinic (8.5%, 5/59). Generally, more than half of the dog owners (58.7%, 88/150) were not knowledgeable about human pre-exposure rabies vaccination while only 7.3% (11/62) of those who knew about it had received the vaccination shot (Table 3).

We recorded that, 22.0% (33/150) of the respondents had prior experience of dog bite (Table 4). Although 82.7% (124/150) of dog owners claimed to know what to do when bitten by dog, only few (20.7%, 21/150) identified the right course of action to take. However, 69.3% (104/150) would seek for medical help at the government hospital (40%, 60/150) if bitten by dogs infected with rabies (Table 4).

Table 4: Attitude of dog owners towards dog bite

Features	Freq. (%)
Have you ever been bitten by a dog?	
Yes	33 (22.0)
No	117 (78.0)
Do you know the steps to take if bitten by a dog?	
Yes	124 (82.7)
No	26 (17.3)
If you were bitten by dog, what would you do?	
Wash wound with soap and water	31 (20.7)
Wash wound with soap and water and painkillers	3 (2.0)
Wash wound with soap and water and antibiotics	10 (6.7)
Wash wound with soap and water and traditional medicine	4 (2.3)
Bandage the injury	10 (6.7)
Use painkillers	10 (6.7)
Traditional medicine	20 (13.3)
Antibiotic	20 (13.3)
Traditional med only	7 (4.7)
Don't do anything	35 (23.3)
If you were bitten by dog, would you seek medical help?	
Yes	104 (69.3)
No	46 (30.7)
^a If yes, which facility would you seek help from?	
Private clinic	34 (22.7)
Government hospital	60 (440.0)
Chemist	3 (2.0)
Pharmacy	3 (2.)
Vet hospital	4 (2.7)
I don't know	46 (30.7)

Key: ^a it is a follow up question to the preceding question

DISCUSSION

The varying degree of knowledge of respondents/dog owners in this study shows that the age had influence on the level of knowledge of rabies; this was corroborated by **Ameh, et al, (2014)** who reported that owners within the age group 20-30 years were more likely to have better knowledge of rabies compared to older respondents. This may be because this age group are youthful and may be more likely to show more interest in dogs and by extension their management.

Having more male respondent dog owners in the study is in agreement with other studies that found

that male respondents were more likely to admit owning dog than female respondents (**Alfayez et al., 2003**). This could be because the responsibility of provision of security in most communities in Nigeria lies more with males than females in addition to the fact that males are also involved in game hunting than the females (**Awoyomi, et al., 2019**).

The level of education of dog owners/respondents that is directly related to their knowledge of rabies may imply that the risk and burden of the development rabies in man and animals may likely be among the least educated/most

vulnerable members of the society, especially members with little or no formal education (**Lapiz, et al., 2012**). Educated members of the society are may have better access to information on rabies on electronic/print media and internet. Similar findings were reported in studies conducted by Awosanya, *et al.*, 2013 and **Ameh, et al., (2014)** in other cities in Nigeria who reported reasonable level of rabies awareness among their respondents because they were quite educated.

The reason more dog owners in this study were single compared to those that are married could be the need for companionship (**Jackson, 2016**). This corroborates the study by **Edukugbo, et al., (2018)** who reported that the non-married were about three times more likely to raise dogs and have positive attitude towards rabies prevention compared to married dog owners.

Dog owners that were private workers and self-employed are expected to have more time to cater for dogs and manage them better. The reasons Christians were the majority that kept dogs in the study area may be religious belief which may not encourage some of the Islamic religion to keep dogs. The low level of vaccination in hunting dogs when compared to dogs kept for security and breeding purposes could be because most hunters are not educated with little or no knowledge of rabies.

Respondents that had more than one dog had higher vaccination coverage most likely due to the fact that people that had many dogs were mainly dog breeders who used the dogs for business and therefore, take better care of their dogs in addition to ensuring their vaccination status are up to date to prevent the dogs coming down with diseases including rabies. Local breeds had low level of rabies vaccination compared to exotic breeds of dogs because local dogs are usually kept for hunting purposes in the study area and were owned by dog owners who had low level of rabies vaccination awareness. Those that bought their dogs and also with higher number of vaccinated dogs compared to respondents who got their dogs as gifts because they paid money in getting the dogs which may make them to value the dogs and take greater precautions in other not to lose the them.

Greater number of respondents that had heard of rabies had higher number of vaccinated dogs as a result of their knowledge on rabies. Dog owners who had heard of rabies were more likely to vaccinate their dogs against the disease than those who did not. This is in agreement with **Awuni, et al.,(2019)**. Majority of the dog owners paid for vaccination and quite a number of them paid more than three thousand naira (₦3000=) per dog annually to ensure that their dogs are protected from rabies.

CONCLUSION

From the demographic analysis of respondents in the study area, single, self-employed, youth/middle aged males were the major dog owners mostly raising a single dog. The highest compliance to rabies vaccination were recorded in respondents that raised more than 3 dogs, dogs kept for breeding/security purposes, those purchased by respondents and not given as gifts , dogs < 1 year of age and exotic breeds like lhasa apso. Good general knowledge was recorded among respondents in knowing about the name of the disease, its transmission to man and route of transmission, a good number of them did not know how humans contract the disease and its clinical presentation in dogs. Many respondents did not have up to date vaccination for their dogs and were not able to give very cogent reasons for failure of vaccination of their dogs considering the deadly nature of the disease. Most of the respondents were also not knowledgeable about human pre-exposure rabies vaccination therefore very few had received previous shots. Majority of the respondents had never had dog bite experience prior to the time of this study. Only about one fifth of those that claimed to know what to do in case of dog bite actually identified the right course of action although a good number of the interviewed dog owners indicated they will seek immediate medical help in government hospitals in case of dog bite.

This study had identified gap in the knowledge about rabies among dog owners, breeders and hunters in the study area. Government and other stakeholders should make provisions for annual rabies awareness campaigns through relevant agencies and professionals and mass media in order to educate dog owners on the transmission, prevention and steps to take when bitten by a dog. Free mass anti-rabies vaccination should be done regularly by government and non-governmental organisations aimed at achieving at least 70% of the dog population (vaccination coverage) necessary for maintaining the required level of herd immunity in the study area.

Conflict of interest:

The authors acknowledge that there is no conflict of interest regarding the research idea and tools, actual, potential and financial, directly or indirectly.

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