



Assessment of Dog Owners' Knowledge on Dog Rabies Vaccination in Rural Communities in Ogun State, Nigeria

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SUMMARY

A cross sectional study was designed to assess knowledge of dog owners towards dog rabies vaccination in rural communities in Odeda local government area of Ogun State. A structured questionnaire was administered to 268 dog owners. The questionnaire sought information on demographic characteristics of the dog owners, their association with dogs, and knowledge about dog rabies vaccine. Data obtained were analyzed using chi square and logistic regression with p value set at ≤ 0.05 . Dog rabies vaccination coverage in the study area was 4.9%. Most of the respondents (67.2%) were not aware of dog rabies vaccine. Only 3% of the dog owners had good knowledge about rabies vaccination. Socio-economic factors that had significant association with knowledge level were age, occupation, educational level and marital status of the respondents. There was also significant association between age, religion, occupation, educational level, awareness on dog rabies vaccination, knowledge about dog rabies vaccination, danger posed by non vaccinated dogs to the public and other animals and the intention of dog owners to vaccinate their dogs against rabies. One hundred and eighty seven respondents (70%) declared their intention to vaccinate their dogs, although 82% affirmed willingness to pay for vaccination of their dogs against rabies; however the average amount indicated was only ₦200.00 (\$0.57). In conclusion, it is free vaccination of dogs against rabies with an aggressive mass orientation on responsible dog ownership and enlightenment on fatality of clinical rabies through the mass media that can significantly alter the vaccination coverage in the studied community

Key words: Rabies, vaccination, dogs, rural communities, intention

INTRODUCTION

Rabies is an almost invariably fatal viral infection of the nervous system of warm blooded animal caused by negative sensed RNA virus

from the Lyssavirus genus. Genetic variant of the genotype Lyssavirus are maintained in different parts of the world by different reservoir hosts within host adaptive landscape (Rupprecht *et al.*, 2008). In Nigeria, published reports and surveys

have incriminated dogs as both the reservoir and the transmitter of rabies (Ogunkoya, 1997). The elimination of canine rabies is feasible, through mass vaccination of dogs with efficient dog rabies vaccines and enforcement of responsible dog ownership. However, large population of dogs in Nigeria is not vaccinated and this ensured the continuous spread of rabies cycle in Nigeria (Odeh *et al.*, 2014). National anti-rabies campaign of November, 2006 at Jos, Plateau state showed that there was poor awareness of rabies vaccine among rural dwellers in Nigeria (Ajayi *et al.*, 2006). At the international level, different target dates were set for rabies elimination; for the Latin American region the target was 2015; for Southeast Asian countries is 2020, and sub-Saharan African where Nigeria belongs is 2030. In order to meet this target there is need to assess knowledge of dog owners about dog rabies vaccination which is pivotal to human rabies elimination in regions where dog mediated transmission of rabies prevails.

MATERIALS AND METHODS

Study area

This study was conducted in rural communities of Odeda Local Government, Ogun State south west Nigeria. The local government area has a geographical grid reference Latitude 7° 13'00"N 3° 31'00"E. Odeda Local Government shares boundaries with Abeokuta south, Abeokuta north and Obafemi-Owode Local Governments and Oyo state in the south, west, east and north respectively (Figure 1). The people of Odeda Local Government are predominantly farmers engaged in small-scale, subsistent or low-key commercial farming.

Study Design

The study was a cross-sectional survey of dog owners in rural community of Odeda Local Government Area. A pre-tested semi-structured questionnaire was administered to 268 respondents that were randomly selected across the three zones of Odeda Local Government Area. The villages selected were Osiele, Abule

Oso, Adao, Akonko, Alabata, Bale Ogunbayo,

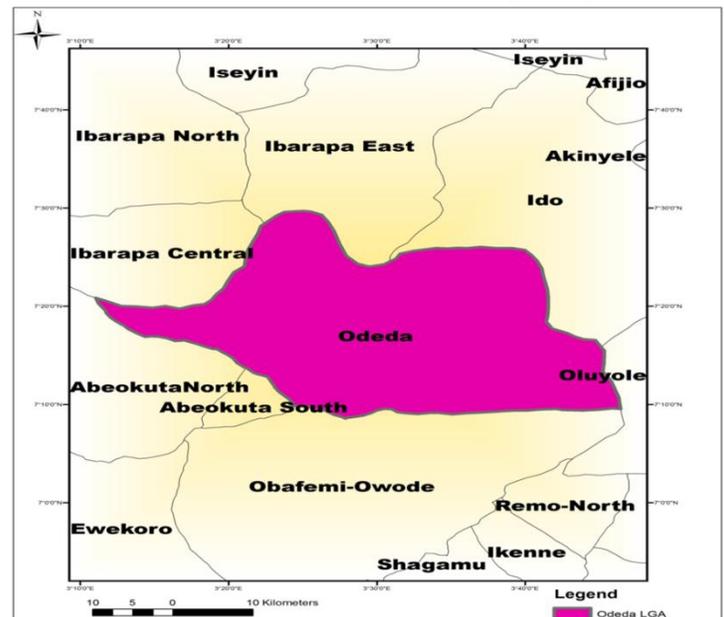


Figure 1: Map of Odeda Local Government Area

Eweje, Ilugun, Kila, Obantoko, Obete, Odeda, Okiri Ojule, Olodo, Olokemeji, Olowo, Oluga Olugbo, Opeji.

The questionnaire was divided into two parts. First part comprises of the general characteristics of the respondent while the second part comprises question on knowledge about dog rabies vaccination, vaccination status of dogs, intention to vaccinatedogs with dog rabies vaccine and the amount they will be willing to pay for vaccination and previous history of dog bite among the respondent household member. The questionnaire was distributed between March 2016 and June 2016. Sample size selected was based on estimated prevalence of dog owning households of 22.1% (Awoyomi, 2016), estimated error of 5% at 95% confidence limits using Epi Info 7TM software.

Data analysis

Retrieved questionnaire was coded and analyzed using SPSS version 17 software. Chi square was used to test level of association among variables with p value set at 0.05. Scoring to assess dog

owners knowledge and understanding of existence, schedule and importance of dog rabies vaccine was generated using four questions which included: “Are you aware of rabies vaccine”, “Are you aware of the age to present your dog for first vaccination”, “How often do you have to present your dog for vaccination” and “Do you know that dogs that are not vaccinated pose serious danger to the public and other animals”. Each correct answer was awarded 2 points while incorrect answer was assigned zero point. Knowledge score ranged from 0 to 8 points: scores below 4 were graded as poor, 4 was graded as fair while scores of 6 and 8 were graded as good.

RESULTS

Demographic characteristics of dog owners

Out of the 268 respondents that participated in the study, 59% were males and 41.0% were females. Respondents 18-25 years of age were 10.4%, 26-35 years were 31.3%, and above 35 years were 58.2%. Most of the respondents were married (88.4%), 10.8% singles while 0.7% were divorced. Majority of the dog owners were farmers (67.5%), 21.3% self-employed, 7.8% civil servants and the rest were students. Based on level of formal education, 34.0% had no formal education, 43.3% had primary school education, 11.9% had Secondary education, and 10.8% had tertiary education. The percentage of the respondents that earned N18, 000 was 62.3%, 18.3% earned N18, 000-50,000, 29% earned N50, 000-100,000 and 1.1% earned more than N 100,000 monthly. Majority of the dogs (39.3%) were less than 1 year, 62.9% of the dogs were male and 95.1% of the dogs had no record of vaccination. Most of the respondents kept dogs for hunting (60, 8%), 16.4% as pets 12.7% as guards while 10% were kept for economic reasons

Factors associated with vaccination of dogs

There was significant relationship between vaccination of dogs with marital status, awareness on rabies vaccination, purpose of keeping dogs and contact with dogs (Table I). Of the respondents, married, those that were aware of rabies vaccination, those keeping dog as pet, those which had contacts with dogs (sometimes) had vaccinated their dogs.

Factors influencing non vaccination of dogs

Majority of the respondents (67.2%) were not aware of rabies vaccine, 25.9% indicated that rabies vaccine was not important, however 0.4% stated that it was expensive while 2.4% opined that there was no means of transportation (Table I).

Dog rabies vaccination knowledge

The mean knowledge score of respondents on dog rabies vaccination was 1.38 ± 1.58 out of 8 points. Only 3.0% of the dog owners had good knowledge about dog rabies vaccination, majority (85.4%) had poor knowledge while 11.6% had fair knowledge. Socioeconomic factors that were significantly associated with the knowledge level were age, occupation, educational level and marital status of the respondents. Forty nine (10.8%) were aware of dog rabies vaccine. Majority of the respondents (52.2%) were not aware of the danger posed by non-vaccinated dogs to the public and other animals (Table II). Nine (3.4%) out of forty nine that were aware of rabies vaccine were aware of the age at which dogs were to be presented for first rabies vaccination (3 months). Three (1.1%) out of forty nine that were aware of rabies vaccine also knew that dogs were to be presented annually after the first rabies vaccination. All respondents let their dogs roam freely within the neighborhood. Almost all the respondents (96.6%) often had contact with dogs, 6(2.2%) sometimes had contact with dogs while only 3(1.1%) rarely had contact with dogs. Ten respondents (3.7%) reported history of dog bite among members of household.

TABLE I: Factors associated with vaccination of dogs in Odeda local government

Variables	NORTV (%)	NORTDV (%)	TNFR (%)	p value
Sex				
Male	9(5.7%)	149(94.3%)	158(59%)	0.44
Female	4(3.6%)	106(96.4)	110(41.0%)	
Age				
18-25	2(7.1%)	26(92.9%)	28(10.4%)	0.42
26-35	2(2.4%)	82(97.6%)	84(31.3%)	
Above 35	9(5.8%)	147(94.2%)	156(58.2)	
Religion				
Christianity	7(4.9%)	135(95.1%)	142(53%)	0.77
Islam	4(4%)	95(96.0%)	99(36.9%)	
Traditional	2(7.4%)	25(92.6%)	27(10%)	
Occupation				
Civil servant	2(9.5%)	19(90.5%)	21(7.8%)	0.06
Self employed	6(10.5%)	51(89.5%)	57(21.3%)	
Farmer	4(2.2%)	177(97.8%)	181(67.5%)	
Other	0(0%)	2(100%)	2(0.7%)	
Student	1(14.3%)	6(85.7%)	7(2.6%)	
Educational level				
No formal education	4(4.4%)	87(95.6%)	91 (34%)	0.53
Primary education	5(4.3%)	111(95.7%)	116(43.3%)	
Secondary education	1(3.1%)	31(96.9%)	32(11.9%)	
Tertiary education	3(10.3%)	26(89.7%)	29(10.8%)	
Marital status				
Single	4(13.8%)	25(86.2%)	29(10.8%)	0.001
Married	8(3.4%)	229(96.6%)	237(88.4%)	
Widow	1(50%)	1(50%)	2(0.7%)	
Awareness				
Aware	5(10.2%)	44(89.8%)	49(18.3%)	0.05
Not aware	8(3.7%)	211(96.3%)	219(81.7%)	
Danger pose by non vaccinated dogs				
Aware	4(3.2%)	121(96.8%)		0.24
Not aware	9(6.3%)	134(93.7%)	125(46.6%)	
Purpose of keeping dogs			143(53.4%)	
Pets	6(13.6%)	38(86.4%)		0.03
Hunting	5(3.1%)	158(96.9%)	44(16.4%)	
Guard	1(2.9%)	33(97.1%)	163(60.8%)	
Economic purpose	1(3.7%)	26(96.3%)	34(12.7%)	0.004
Contact with dog			27(10.0%)	
Often	11(4.2%)	248(95.8%)		
Sometimes	2(33.3%)	4(66.7%)	259	
Rarely	0(0%)	3(100%)	6	
			3	

Legend: FAWND: Factors associated with non vaccination of dogs.
 NORTV: number of owners that vaccinate their dogs with rabies vaccine.
 NORTDV: number of owners that do not vaccinate their dogs with rabies vaccine.
 TNFR: Total number of factors associated with vaccination of dogs

Table II: Factors affecting level of knowledge of dog owners about rabies vaccine

Variables	Total	Knowledge score Percentage			p value
		Poor	Fair	Good	
Sex					
Male	158	56.3%	87.1%	25%	0.001
Female	110	43.7%	12.9%	75%	
Age					
18-25	28	10%	3.2%	50%	0.003
26-35	84	31.9%	35.5%	0(0%)	
>35	156	58.1%	61.3%	50%	
Occupation					
Civil servant	21	7.4%	9.7%	12.5%	<0.001
Self employed	57	21.8%	16.1%	25%	
Farmer	181	68.6%	74.2%	12.5%	
Others	2	0.9%	0%	0%	
Student	7	1.3%	0%	50%	
Educational level					
No formal education	7	34.1%	41.9%	0%	<0.001
Primary education	91	45.4%	12.5%	43.3%	
Secondary education	116	12.2%	9.7%	12.5%	
Tertiary education	32	8.3%	12.9%	75%	
Marital status					
Single	29	10.5%	3.2%	50%	0.005
Married	237	88.6%	96.8%	50%	
Divorced	2	0.9%	0%	0%	

Determinants of intention of dog owners to vaccinate their dogs

There was significant association between age, religion, occupation, educational level, awareness on dog rabies vaccination, knowledge about dog rabies vaccination, danger pose by non-vaccinated dogs to the public and other animals and purpose of keeping dogs on the intention of dog owners to vaccinate their dogs (Table III). Majority of the respondents (83.6%) stated their willingness to pay for rabies vaccine but 17.9% were not ready to pay for the vaccination. However, 43.7% reported that they would pay N200, 6.3% indicated that they would pay N 500, 0.7% were of the opinion of paying N 1000, 1.9% agreed of paying N 1500, but 22% stated their willingness to pay N 100 and few (16.4%) reported they cannot pay for vaccination.

Characteristics of dog bites victims in respondents household

Out of 268 of the respondents, ten had history of been bitten by dog within the previous one year. Fifty percent of the victims visited hospitals also 50% of the victims were bitten by unknown dog. Characteristic of dog bite victims is presented in Table IV.

DISCUSSION

Rabies remains an important public health problem in Nigeria, where canine rabies is not controlled on a large scale, and the bite of an infected dog is the most common means of transmission. The findings of this study highlight key factors that influence dog rabies vaccination coverage across Odeda communities. Most of the dog owners were males and married. This is in line with other studies that also found that male

Table III: Determinants of intention of dog owners to vaccinate their dogs in Odeda LGA

Variables	NRI	NRN	TFR	P value
Sex				
Male	114(72.2%)	44(27.8%)	158(59%)	0.31
Female	73(66.4%)	37(33.6%)	110(41%)	
Age				
18-25	27(96.4%)	1(3.6%)	28(10.4%)	< 0.001
26-35	44(52.4.6%)	40(47.6%)	84(31.3%)	
>35	116(74.4%)	40(25.6%)	156(58.2%)	
Religion				
Christianity	124(87.3%)	18(12.7%)	142(52.9%)	< 0.001
Islam	47(47.5%)	52(52.5%)	99(36.9%)	
Traditional	16(59.3%)	11(40.7%)	27(10.0%)	
Occupation				
Civil servant	13(61.9%)	8(38.1%)	21(7.8%)	0.06
Self employed	46(80.7%)	11(19.3%)	57(21.2%)	
Farmer	119(65.7%)	62(6.2%)	181(67.5%)	
Others	2(100%)	0(0%)	2(0.7%)	
Student	7(100%)	0(0%)	7(2.6%)	
Educational level				
No formal education	74(81.3%)	17(18.7%)	91(34%)	0.01
Primary education	70(60.3%)	46(39.7%)	116(43.3%)	
Secondary education	23(71.9%)	9(28.1%)	32(11.9%)	
Tertiary education	20(69.0%)	9(31%)	29(10.8%)	
Marital status				
Single	22(75.9%)	7(24.1%)	29(10.8%)	0.48
Married	163(68.8%)	74(31.2%)	237(88.4%)	
Divorce	2(100%)	0(0%)	2(0.7%)	
Are you aware of dog rabies vaccine				
Yes	42(85.7%)	7(14.3%)	49(18.3%)	0.01
No	145(66.2%)	74(33.8%)	219(81.7%)	
Are you aware of danger pose by non vaccinated dogs				
Yes	106(84.8%)	19(15.2%)	125(46.6%)	<0.001
No	81(56.6%)	62(43.4%)	143(53.4%)	
Purpose of keeping dog				
Pet	22(50%)	22(50%)	44(16.4%)	0.001
Hunting	112(68.7%)	51(31.3%)	163(60.8%)	
Guard	29(85.3%)	5(14.7%)	34(12.7%)	
Economic purpose	24(88.9%)	3(11.1%)	27(10.1%)	
History of member of family been bitten by dog				
Yes	6(85.7%)	1(14.3%)	7(2.6%)	0.23
No	110(79.1%)	29(20.9%)	139(51.9%)	

Legend: NRI: Number of the respondents that intend to vaccinate their dogs.
 NRN: Number of respondents that do not have intention to vaccinate their dogs.
 TFR: Total number of the factor of the respondent

respondents were more likely to report having ever owned a dog than female respondents (Hsu *et al.*, 2003 and Alfayez *et al.*, 2003). This may be due to differences in occupation and availability of leisure time to take care of pets. Furthermore, issue of security lies more with males in the society and they are also involved in game hunting. Dog rabies vaccination coverage in Odeda Local Government was 4.9%. The

Table IV: Characteristics of dog bites victims in respondents household in Odeda LGA

Variables	Frequency	Percentage
History of been bitten by dog within the last 1 year		
Yes	10	3.7
No	256	96.3
Handling		
Visited hospital	5	1.9
Self-management	4	1.5
Health professionals.	1	0.4
Which dog inflicted the injury		
Owned dog	2	0.7
Neighbors dog	4	1.5
Unknown dog	4	1.5
Age of the victim		
1-10 years	2	0.7
11-20 years	3	1.1
31-40 years	3	1.1
51-60 years	2	0.7
Sex of the victim		
Male	6	2.2
Female	4	1.5
Part of the body been bitten		
Hand	2	0.7
Leg	8	3.0

vaccination coverage was very low and below recommended level (WHO, 1992). The low coverage might be explained by the low levels of awareness, beliefs and socio-economic factors among the respondent. Similarly, studies in Asia

showed that educational level, dog ownership and veterinary service access are important factors affecting vaccination coverage (Nadin *et al.*, 2008). It is, therefore, important to raise awareness on fatality of rabies infection in man considering the fact that the unvaccinated dogs serve as a ready field for rabies virus multiplication and spread since one rabid dog is sufficient to infect all dogs in the whole community. Vaccination of dog against rabies is the bedrock of cost effective rabies elimination in dog mediated transmission of rabies, however it is very worrisome to find out that almost 90% of dog owners in Odeda were not aware of dog rabies vaccination. This is not unlikely to be due to their level of education as 77.3% of the respondent had less than secondary education. Furthermore, one of the factor influencing better knowledge included education this means that the greatest risk of developing rabies is likely to fall on the most vulnerable sectors of society, especially members with little or no formal education (Lapiz, *et al.*, 2012).

Despite the fact that most of the respondents claimed not to be aware of dog rabies vaccination, however 70% indicated intention to vaccinate their dogs. The implication of this is that all things being equal, during a mass vaccination campaign it will not be difficult to get at least 70% of dogs in the study area vaccinated against rabies.

Although respondents (82%) declared a willingness to pay for vaccination of their dogs against rabies, however the average amount indicated was only ₦200.00. Willingness to pay studies based on surveys such as this one have limitations as actual behaviour may differ from self-reported claims and is expected to be lower in practice. In West Africa much lower vaccination coverage (~25%) was achieved when owners were charged in comparison to earlier free vaccinations (68–87%) (Durr *et al.*, 2009). Therefore while planning for mass dog rabies vaccination full-cost recovery concepts will not ensure that enough dogs are vaccinated

to interrupt rabies transmission in dogs in rural areas as shown in this study. Obviously, in order to have at least 70% of all dogs vaccinated, policy makers must consider means to substantially subsidize dog rabies vaccinations. Only 3.7% of the respondents reported cases of dog bite among the members of their household, the victims were mostly males (60%) and site of bite was more frequently at the lower limb (80%), however only 50% of the bite incidence were reported in the hospital, this is in agreement with the previous studies (Rosado *et al.*, 2009 and Tenzin, 2011). Males may be more daring than females and the involvement of the lower limb may be as a result of using the limbs to either tease or hit the biting dog. Also in an attempt to flee in case of impending attack legs will be more accessible by dogs to inflict bite.

CONCLUSION

Respondents in this study showed poor level of knowledge about dog vaccination against rabies, which was significantly affected by age, educational status and occupation. Vaccination coverage of dogs against rabies is very poor however most of the respondents had intention to have their dogs vaccinated against rabies and were willing to pay a token for this service. These imply that there will be a massive support by the masses during a future campaign against rabies targeting vaccination of dogs in the study area all things being equal. The following recommendations are therefore made:

1. Public enlightenment on the dangers of rabies, its mode of transmission and how it can be controlled and prevented should be instituted. Knowledge about rabies, proper pet care practices and responsible dog ownership should be emphasized to dog owners in order to adequately control the disease.
2. Free or highly subsidized mass dog vaccination campaign against rabies should be carried out to ensure coverage of at least 70-80% of dog population in the study area and all other rural communities

3. Awareness raising interventions aimed at addressing critical knowledge gaps should therefore be targeted to reach all sectors of the population, including those in more marginalized communities.

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