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Original Research

Knowledge, Attitudes, and Practices of Dog Owners Following Dog bites in Umuahia North and South, Abia State, Nigeria

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ABSTRACT

Rabies, a fatal neurological disease of warm-blooded animals, is endemic and occurs throughout the year in all parts of Nigeria. A cross-sectional study was carried out to assess dog owners' knowledge, attitudes, and practices following dog bites. Umuahia North and Umuahia South Local Government Areas (LGAs) were purposively selected being active urban areas. A validated well-structured questionnaire was administered to 200 dog owners by face-to-face interviews who were consenting respondents conveniently selected from the study site. Data generated were analysed with statistical significance at $p \leq 0.05$. Out of the 200 dog owners, 172 (86%) were not aware of rabies, 48 (24%) were of the notion that rabies does not kill only animals and 52 (26%) did not know that the virus that causes rabies is found in the nerves. One hundred and fifty (75%) respondents knew that rabies could be spread through the saliva of a rabid animal, 9 (4.5%) did not know that dogs are possible common sources of rabies in Nigeria and only 125 (62.5%) knew the age at which dogs should receive the first dose of rabies vaccine. Also, a good number of them 162 (80%) knew that keeping dogs that are not vaccinated against rabies is dangerous and should be avoided. One hundred and forty five (72.5%) respondents agreed that dog handlers should always wear protective clothing, and 117 (58.5%) accepted that it is good to wash dog bite wounds with soap and water. Age, Marital status, Occupation and Qualification were the socio-demographic variables associated with the knowledge, attitude and practice level of the respondents that were statistically significant ($P \leq 0.05$). Inadequate knowledge of some aspects of rabies, negative attitudes, and practices of dog owners following dog bites are indicative of a high risk of exposure of dog owners to rabies. It is suggested that public health education targeting dog owners be implemented to increase their level of awareness of rabies.

. **Keywords:** Knowledge, attitude, dog bite, practice, rabies

INTRODUCTION

Rabies is a viral zoonotic and epizootic disease of worldwide importance that can be prevented through vaccines (Daodu & Oluwayelu, 2016). It is caused by the neurotropic organism, rabies virus which belongs to the family Rhabdoviridae and genus Lyssavirus (WHO, 2016). The reservoir hosts for the rabies virus are jackals, foxes, raccoons, skunks, and dogs (Aiyedun *et al*., 2022). The common route of transmission of rabies to humans is through the bite of a rabid animal and this disease causes acute fatal encephalitis with an almost 100% case fatality rate (Ameh *et al*., 2014). Canine rabies remains a major socioeconomic and public health problem in developing countries, claiming the lives of an estimated 55,000 people each year (Knobel *et al*., 2005; Coleman *et al*., 2004) and it is estimated that the number of deaths due to rabies maybe 10 times more than those reported.

The most effective mode of prevention of rabies in humans is through vaccination, both pre and post- exposure vaccinations are available (Aiyedun *et al*., 2022). Every year approximately 1.1 to 1.5 million people receive post-exposure prophylactic treatment. In most developing countries, there is a high burden of rabies mortality despite the availability of effective human and animal rabies vaccines which may be an indication that the rabies prevention and control efforts might be inadequate (Mascie *et al*., 2003).

In Nigeria, there is limited data on reported rabies cases in humans which could be due to under reporting, misdiagnosis of the disease, and limited knowledge on the disease which

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makes it difficult to assess its public health impact (Awoyomi *et al.*, 2019). General poor awareness and knowledge of rabies infection are some factors that have led to the gross under-reporting of rabies cases in Nigeria and so it is important that the knowledge level of humans especially those at risk of infection in order to be able to educate and create awareness of the public health significance of this disease (Edukugho *et al.*, 2018). The aim of this study therefore was to evaluate the knowledge, attitudes, and practices of dog owners following dog bites in Umuahia north and South, Abia state.

MATERIALS AND METHODS

STUDY AREA

Umuahia is the capital city of Abia State and represents the urban area of the State. The capital metropolis is basically made up of two LGAs; Umuahia North and Umuahia South. This **st**udy was carried out in Umuahia north and south LGA of Abia State, Nigeria.

Umuahia lies on longitude $7^0$29'E, Latitude $5^0$321N in the geographical map of Nigeria and Umuahia has a total population of 359,230 as at 2006 census. Umuahia town is traditionally owned by the Ibeku after early British administrative based the town in their lands. Towns bordering it are Aba, Okigwe, Abiriba, Ohafia, and Owerri (Chidiebere *et al*., 2018). The major occupations of the people are civil service and trading.

STUDY PARTICIPANTS AND SURVEY

In this study, a cross-sectional design was used was used to assess the knowledge, attitudes and practices of the participants. Two hundred (200) respondents who were dog owners were selected for this study from the selected study areas of Umuahia South and Umuahia north LGAs using convenience sampling.

SURVEY TOOL AND QUESTIONNAIRE

The survey tool used for this study was a well-structured questionnaire. The questionnaire used for the study had different sections and was arranged so the participants could easily comprehend and was pre-tested and validated for the study. The pre-tested structured questionnaire was administered to the dog owners through face-to-face interview carried out for a period of four months. The questionnaire assessed the knowledge, attitude and practices of dog owners in relation to dog bites. The questionnaire comprised of five sections consisting of demographic information of the respondents, association of respondents with dogs, information on their knowledge, attitudes and practices to rabies.

ETHICAL CONSIDERATIONS

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

DATA ANALYSIS

Data analysis was carried out using the Statistical Package for Social Science (SPSS) software. Descriptive statistics was used to present the demographic variables. For the inferential analysis, Chi-square test was used to test for associations and logistic regression to measure associations of the variables. The significant difference was measured at P value ≤ 0.05

RESULTS

DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Out of the 200 respondents that participated in the study, 107 (53.5%) were females while 93 (46.5%) were males. Respondents 20 – 30 years were 85 (42.5%) and 31-40 years were 45 (22.5%). Respondents that were unemployed were 41 (20.5%), 65(32.5%) were civil servants and 36 (18%) were Business men/women. Based on the qualification of respondents, 43 (21.5%) had Secondary School education and the majority 137 (68.5%) had Tertiary education (Table I).

ASSOCIATION WITH DOGS

All of the 200 (100%) respondents were dog owners with approximately 1 dog per household. 73 (36.5%) of the respondents kept dogs for companionship and 88 (44%) kept dogs for protection. More than half of the respondents 133 (66.5%) had specifically constructed/cages for their dogs while the majority of respondents 174 (87%) never allowed dogs to leave the premises. Respondents who reported that they had been previously bitten by a dog were 46 (23%) (Table II).

KNOWLEDGE OF RABIES

The majority of the respondents 172(86%) attested that they had heard of rabies before. One hundred and fifty-one (75.5%) respondents agreed that rabies does not kill only animals, 107 (53%) knew that rabies virus can be found in the nerve and 150 (75%) agreed that rabies can be spread through the saliva of a rabid animal. 151 (75.5%) knew that all dogs can be infected with rabies and can transmit the disease as well, 113 (56.5%) affirmed that if a dog bites you without provocation, it is likely to be a rabid dog, and 143 (71.5%) knew that all human being can be infected with rabies (Table III). Sex (X^2 = 5.010,df = 1, p = 0.025), Occupation (X^2 = 27.153,df = 5, p = 0.000), Qualification (X^2 = 39.332,df = 3, p = 0.000) were the socio-demographic variables associated with the knowledge level of the respondents that were statistically significant (Table IV).

Table I: Socio-demographic characteristics of respondents

Characteristics	Frequency (N= 200)	Percentage (%)
Age		
<19	18	9%
20-30	85	42.5%
31-40	45	22.5%
40-50	30	15%
>50	22	11%
Sex		
Female	93	46.5%
Male	107	53.5%
Marital status		
Married	93	46.5%
Single	107	53.5%
Occupation		
Unemployed	41	20.5%
Civil Servant	65	32.5%
Business man/woman	36	18%
Farmer	16	8%
Hunter	1	0.5%
Others	42	20.5%
Qualification		
No formal education	14	7%
Primary	6	3%
Secondary	43	21.5%
Tertiary	137	68.5%
Religion		
Christian	200	100%
Islam	-	-
Others	-	-

ATTITUDE TOWARDS RABIES

The majority of respondents 154 (77%) said that they do not allow stray dogs to roam freely into their compounds, almost all the respondents 192 (96%) said that they would go to the hospital if bitten by a dog and 137 (68.5%) agreed that children should not be allowed to play with dogs. Most of the respondents 172 (86%) number of respondents affirmed that they do not play with unknown dogs, 162 (81%) agreed that keeping dogs that are not vaccinated against rabies is dangerous and should be avoided while 184 (92%) of respondents affirmed that it is right to vaccinate their dogs against rabies (Table 5). Age ($X^2 = 10.483$,df = 4, p = 0.033), Occupation ($X^2 = 11.535$,df = 5, p = 0.042) and Qualification ($X^2 = 21.273$,df = 3, p = 0.000) were the socio-demographic variables associated with the attitude level of the respondents that were statistically significant (Table VI).

Table II: Association of respondents with dogs

Characteristics	Frequency (N= 200)	Percentage (%)
Do you keep dogs?		
Yes	200	100%
No	-	-
How many dogs do you own?		
None	-	-
1	96	48%
2	54	27%
3	31	15.5%
>3	19	9.5%
Why do you keep dogs?		
For companionship	73	36.5%
For protection	88	44%
For hunting	9	4.5%
Others	30	15%
For how long have you been keeping dogs?		
1-5 years	115	57.5%
6-10 years	48	24%
11-15 years	23	11.5%
Others	14	7%
How are the dogs in your previews housed?		
Specially constructed house/cage	133	66.5%
On house passageway/corridor	29	14.5%
Anywhere on the premises	38	19%
How do you control your dogs' movement?		
Never allowed to leave the premises	174	87%
Allowed to roam freely on the neighbourhood	26	13%
Have you ever been bitten by a dog?		
Yes	46	23%
No	154	77%

Practices towards rabies

The majority of the respondents 141 (70.5%) advised that dog handlers should receive human anti-rabies vaccine,

Table II: Knowledge of the respondents on Rabies

Characteristics	Frequency (N= 200)	Percentage (%)
Have you heard of rabies before?		
Yes	172	86%
No	28	14%
Rabies kills only animals		
Yes	48	24%
No	151	75.5%
Unanswered	1	0.5%
The virus that cause rabies is found in the nerve		
Yes	107	53.5%
No	52	26%
Unanswered	41	20.5%
Rabies can be spread through the saliva of a rabid animal		
Yes	150	75%
No	28	14%
Unanswered	22	11%
All dogs can be infected with rabies and can transmit the disease as well		
Yes	151	75.5%
No	15	7.5%
No idea	33	16.5%
Unanswered	1	0.5%
Dogs are the possible common sources of rabies in Nigeria		
Yes	160	80%
No	9	4.5%
No idea	28	14%
Unanswered	3	1.5%
If a dog bites you without provocation, it is likely to be a rabid dog		
Yes	113	56.5%
No	30	15%
No idea	57	28.5%
All human beings can be infected with rabies		
Yes	143	71.5%
No	45	22.5%
Unanswered	12	6%
Bites from an infected animal cannot spread rabies to other animals		
Yes	50	25%
No	73	36.5%
No idea	75	37.5%
Unanswered	2	1%
At what age should dogs receive the first dose of rabies vaccine?		
3 months	125	62.5%
9 months	5	2.5%
Don't know	32	16%
Unanswered	2	1%
An infected human being can transmit rabies to one another.		
Yes	83	41.5%
No	38	19%
6 months	36	18%
No idea	77	38%
Unanswered	2	1%
A friendly dog that suddenly turns aggressive can be rabid.		
Yes	116	58%
No	26	13%
No idea	56	28%
Unanswered	2	1%
A man/woman that has rabies may not like to drink water.		
Yes	80	40%
No	17	8.5%
Don't know	101	50.5%
Unanswered	2	1%
Excessive foamy salivation and tendency to bite anything are signs of rabies		
Yes	103	51.5%
No	14	7%
No idea	79	39.5%
Unanswered	4	2%
Dog registration and licensing helps in the control of rabies.		
Yes	172	86%
No	18	9%
Unanswered	10	5%
Vaccination of dogs against rabies should be repeated every year.		
Yes	163	81.5%
No	6	3%
Don't know	26	13%
Unanswered	5	2.5%
Can contact with a sick dog (mad dog) cause danger to your health?		
Yes	180	90%
No	16	8%
Unanswered	4	2%

145(72.5%) said that dog handlers should always wear protective clothing, and 117 (58.5%) said that it was good to wash dog bite wounds with soap and water (Table VII). Age ($X2 = 10.483, df = 4, p = 0.000$), Marital status ($X2 = 17.591, df = 1, p = 0.000$) ,Occupation ($X2 = 30.645, df = 5, p = 0.000$) and Qualification ($X2 = 34.523, df = 3, p = 0.000$) were the socio-demographic variables associated with the

DISCUSSION

The dog owners in this study showed an acceptable level of knowledge of rabies from dog bites. Most of the respondents had heard of rabies previously and were more likely to have vaccinated dog due to awareness of its fatal nature if left

untreated. The response on rabies knowledge is also consistent with the studies done by Sambo, (2012) in Tanzania, Kongkaew *et al*., (2004) in Thailand, and Matibag *et al*., (2009) in Sri Lanka where 96%, 93%, and 95% respectively of the respondents knew of rabies. There was a statistically significant association between sex, education, occupation to the level of knowledge of the respondents. This is in agreement with the findings of Isek, (2013) and Ameh *et al*. (2014). This is probably due to awareness and access to information by the respondents on rabies and the importance of dog vaccination. This could also be attributed to the fact that almost half of the respondents were between the ages of 20-30. This is in agreement with the study of Ameh *et al*. (2014) who reported that owners within this age group were more likely to be interested in keeping dogs and their management and thus would have a higher knowledge of rabies. Also, more than half of the respondents 107 (53.5%) were male, this finding is in agreement with the studies done by Edukugho, (2014), Ameh *et al*., (2014) and Aiyedun *et al*., (2022). This could be due to the fact that males are more likely to own up to having dogs than females (Aiyedun *et al*., 2022).

Table IV: Socio-demographic predictors of Knowledge level of the respondents

Variable	Good	Poor	X2	Df	P-value
Age (years)					
<I9	11	7			
20-30	51	34			
31-40	28	17	7.528	4	0.110
40-50	17	13			
>50	13	9			
Sex					
Female	48	45	5.010	1	0.025*
Male	59	48			
Marital status					
Single	63	44	2.308	1	0.129
Married	59	34			
Occupation					
Unemployed	24	17			
Civil Servant	34	31			
Business man/woman	22	14	27.153	5	0.000*
Farmer	7	9			
Hunters	1	0			
Others	22	19			
Qualification					
No formal education	6	8			
Primary	4	2	39.332	3	0.000*
Secondary	26	17			
Tertiary	86	51			
Religion					
Christian	124	76	0.291	1	0.590

Table V: Attitudes of the respondents

Characteristics	Frequency (N= 200)	Percentage (%)
It is good to nurse an unknown sick dog.		
Yes	33	16.5%
No	129	64.5%
Undecided	36	18%
Unanswered	2	1%
I do not allow stray dogs to roam freely in my compound.		
Yes	154	77%
No	22	11%
Undecided	20	10%
Unanswered	4	2%
If I am bitten by a dog, I will go to the hospital		
Yes	192	96%
No	8	4%
Children should not be allowed to play with dogs		
Yes	137	68.5%
No	60	30%
Unanswered	3	1.5%
It is inhumane/bad to confine your dogs		
Yes	69	34.5%
No	95	47.5%
Undecided	34	17%
Unanswered	2	1%
I do not play with unknown dogs		
Yes	172	86%
No	14	7%
Undecided	14	7%
Keeping dogs that are not vaccinated against rabies is dangerous and should be avoided		
Yes	162	81%
No	15	7.5%
Undecided	22	11%
Unanswered	1	0.5%
It is right to vaccinate my dog against rabies		
Yes	184	92%
No	11	5.5%
Unanswered	5	2.5%

Table VI: Socio-demographic predictors of Attitude level of the respondents

Variable	Good	Poor	X^2	Df	P-value
Age (years)					
<I9	12	6			
20-30	59	26			
31-40	33	12	10.483	4	0.033*
40-50	20	10			
>50	16	6			
Sex					
Female	64	29	0.666	1	0.414
Male	74	33			
Marital status					
Single	73	34	2.171	1	0.141
Married	65	28			
Occupation					
Unemployed	27	14			
Civil Servant	69	16			
Business man/woman	27	9	11.535	5	0.042*
Farmer	11	5			
Hunters	1	0			
Others	24	14			
Qualification					
No formal education	8	6			
Primary	4	2	21.273	3	0.000*
Secondary	25	18			
Tertiary	81	56			
Religion					
Christian	139	61	0.121	1	0.728

The responses by the respondents on the attitudes of not allowing stray dogs to roam freely into their compounds, going to the hospital if bitten by a dog, not playing with unknown dogs, the importance of vaccinating their dogs against rabies, and recognizing the danger in keeping unvaccinated dogs show good attitude towards the control of rabies. This finding agrees with the studies done by Gino *et al*. (2009), Isek, (2013) and Ameh *et al*. (2014). There was a statistically significant association between age, occupation qualification and attitude of the respondents to rabies.

Practices of good vaccination of dogs, the majority of the respondents indicated their willingness to vaccinate their pets. This is important because mass dog vaccination is believed to be the most effective measure for the control of the disease and the prevention of human deaths (Rine *et al*., 2017). This finding was consistent with results recorded in

Table VII: Practices of the respondents

Characteristics	Frequency (N= 200)	Percentage (%)
It is good to vaccinate your dogs		
Yes	191	95.5%
No	5	2.5%
Unanswered	4	2%
Dog handler should always wear protective clothing		
Yes	145	72.5%
No	19	9.5%
Undecided	36	18%
It is good to wash dog bite wound with soap and water		
Yes	117	58.5%
No	29	14.5%
Undecided	51	25.5%
Unanswered	3	1.5%
Dog handlers should receive human antirabies		
Yes	141	70.5%
No	13	6.5%
Undecided	46	23%

Table VIII: Socio-demographic predictors of Practice level of the respondents

Variable	Good	Poor	X^2	Df	P-value
Age (years)					
<I9	12	6			
20-30	69	16			
31-40	35	10	32.028	4	0.000*
40-50	18	12			
>50	12	10			
Sex					
Female	64	29	3.837	1	0.05
Male	75	32			
Marital status					
Single	85	22	17.591	1	0.000*
Married	54	39			
Occupation					
Unemployed	31	10			
Civil Servant	44	21			
Business man/woman	25	11	30.645	5	0.000*
Farmer	7	9			
Hunters	1	0			
Others	34	7			
Qualification					
No formal education	5	9			
Primary	3	3	34.523	3	0.000*
Secondary	28	15			
Tertiary	77	30			
Religion					
Christian	139	61	0.211	1	0.646

Sri Lanka in which the majority of the participants were in favour of rabies control programs that mainly focused on stray dog population control (Gino *et al*., (2009). Also, good practices of vaccination of dogs, advising dog handlers to wear protective clothing and take human anti-rabies vaccine, and washing of dog bite wounds with soap and water are indicators that the community is involved in the control of the disease (Ameh *et al*., 2014). Good practices of washing dog bite wounds with soap and water are in accordance with the WHO recommendation of instituting medical treatment for victims of dog bites. These positive practices may be a result of adequate awareness of the possible dangers of rabies. The level of practice towards rabies preventive measures among the participants of this study was satisfactory.

CONCLUSION

Overall, the results from this study showed that the respondents had a good level of knowledge, attitude, and practices towards rabies. This means that the respondents in the study location have been exposed to awareness of this disease and its public health significance. Nevertheless, continuous education and awareness on rabies are still required especially for dog owners and others who come in contact with dogs frequently since rabies is a fatal disease and remains endemic in Nigeria.

REFERENCES

Aiyedun, J. O., Darajat, A. T., Daodu, B. O., Oludairo, O. O., Olorunshola, I. D., Nwoha, R. I. O., & Oluboyede, I. S. (2022). Assessment of the Knowledge, Attitude, and Practices of Dog Owners on Rabies in Ilorin, Kwara State, Nigeria. Journal of Applied Veterinary Sciences, 7 (4), 81– 86.

Ameh, V.O, Dzikwi, A.A. & Umoh J.U. (2014). Assessment of Knowledge, Attitude, and Practice of Dog Owners to Canine Rabies in Wukari Metropolis, Taraba State Nigeria. *Global Journal of Health Science*, 6(5), 226-240

Awoyomi, O. J., Bankole, N. O., Kehinde, O. O & Adebowale, O. O. (2019). Assessment of Dog Owners' Knowledge on Dog Rabies Vaccination in Rural Communities in Ogun State, Nigeria. *Nigerian Veterinary Journal*, 40 (4), 278 - 286.

Coleman, P.G., Fevre, E.M & Cleaveland, S. (2004). Estimating the public health impact of rabies. *Emerg. Infect. Dis*. 10,140-142.

Daodu, O. B., & Oluwayelu, D. (2016). Rabies knowledge and pre-exposure vaccination status of clinical veterinary medicine students in Nigeria. *Vom Journal of Veterinary Science*, 11, 117-125.

Edukugho, A.A (2014). Prevalence of Rabies in slaughtered dogs and Knowledge, Attitude, and Practice of Residents Abuja Municipal Area Council of the Federal Capital Territory, Nigeria towards rabies. Zaria: M.Sc. Thesis, Ahmadu Bello University.

Edukugho, A. A., Umoh, J. U., Diem, M., Ajani, O., Uba, B., Okeke, L., Adedire, E., Adefisoye, A., Edukugho, C., and Nguku, P (2018). Knowledge, attitudes, and practices towards rabies prevention among residents of Abuja municipal area council, Federal Capital Territory, Nigeria. *The Pan African Medical Journal*, 31, 21.

Gino, C., Yoshihide, O., Koji, K., Hiroko, Y., Bandula, R., Gamini, P., Niranjala, De Silva, D.D., Panduka, De S, Gunawardena, G.S., Ananda, J., Rossana, A.D & Hiko, T. (2009). A pilot study on the usefulness of information and education campaign materials in enhancing the knowledge, attitude, and practice on rabies in rural Sri Lanka. *J. Infect. Developing Countries* 3(1), 55-64.

Isek, T.I (2013). Epidemiological studies of canine Rabies in Ogoja, Cross River State, Zaria M.sc. Thesis, Ahmadu Bello University.

Kongkaew, W., Coleman, P., Pfeiffer, D.U., Antarasena, C & Thiptara, A (2004). Vaccination on the verge and epidemiological parameters of the owned dog population in Thungsong district, Thailand. *Prev vet med* 65(1), 105-115.

Knobel, D.L., Cleaveland, S., Coleman, P.G., Fevre, E.M., Meltzer, M.I., Miranda, M.E.G.,Shaw, A., Zinsstag, J & Meslin, F.-X (2005). Re-evaluating the burden of rabies in Africa and Asia. *Bulletin of the World Health Organization*, 83, 360-368.

Mascie-Taylor, C.G., Karim, R., Karim, E., Akhtar, S., Ahmed, T. and Montanari, R.M (2003). The cost-effectiveness of health education in improving Knowledge and awareness about Intestinal parasites in rural Bangladesh. *Econ. Hum Biol*.1(3), 321-330.

Matibag, G.C., Ohbayashi, Y., Kanda, K., Yamashinga, H., Kumara, W.R., Perera, I.N., DeSilva, D.D., De S Gunawardena, G.S., Tayasinghe, A., Ditangco, R.A & Tamashiro, H (2009). A pilot study on the usefulness of information and education campaign materials in enhancing the knowledge, attitude, and practice on rabies in rural Sri Lanka. *I Infect Dev Ctries* 3(1), 55-64.

Park, K. (2002). Park's textbooks of Preventive and Social Medicine 17th edition, pages 207-215.

Rine, R. C., Dogara, G. S. & Pam, M. D. (2017). Knowledge, Attitude and Practice of Rabies in and Around Lafia Metropolis, Nigeria. *Central African Journal of Public Health*. Vol. 3(3), 27-33.

Sambo, M. B. (2012). Epidemiological dynamics of rabies in Tanzania and its impacts on local communities. MSc(R) Thesis, University of Glasgow.

WORLD HEALTH ORGANIZATION (WHO), (2016). Rabies Factsheet. Geneva, Switzerland: WHO; 2016. Available from:http://www.who.int/mediacentre/factsheets/fs099/en/.