

Knowledge, attitudes and practices (KAP) evaluation regarding rabies in the Centre, Adamawa and North Regions of Cameroon

NGAH OSOE BOULI Freddy Patrick^{1,2*}, AWAH-NDUKUM Julius^{2,3}, TEJIOKEM Cyrille Mathurin⁴ and MINGOAS KILEKOUNG Jean-Pierre³.

¹Ministry of Livestock Fisheries and Animal Industries, Cameroun.

²Faculty of Agronomy and Environmental Sciences-University of Dschang, Cameroun.

³School of veterinary Sciences and Medicine- University of Ngaoundéré, Cameroun.

⁴Centre Pasteur du Cameroun.

*Corresponding author. Email: ngahosoe@yahoo.com

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ABSTRACT: Rabies has been proven to be endemic in Cameroon and in order to understand the determinants of this situation a Knowledge-Attitudes-Practices (KAP) evaluation has been undertaken in three regions with different sociodemographic characteristics of the country (Centre, North and Adamawa) from September 2012 to July 2014. Forty-five questions have been addressed to 2500 households, 500 each in Garoua and Ngaoundéré cities in North and Adamawa, and 1500 in Yaoundé, one person chosen randomly per household. The overall answered rate was 44.72%, with 79.6% in Garoua, 49.6% in Ngaoundéré and 31.47% in Yaoundé with a total of 1118 households with exploitable data. 88.73% of these persons said they have heard about rabies, 97.88% of them being able to name at least one of the susceptible species. The transmission of rabies has been mostly associated to bites which has been cited 90.87% in animals and 96.44% in humans respectively by 64.01% and 79.33% of the population. However, this knowledge was very limited as wrong means of transmission as sexual intercourses, dirtiness, and consumption of dogs have also been listed. Furthermore, more than a half (52.22%) of people who have heard about rabies claim that the disease can be cured at any stage of its evolution, 3.65% of them saying that the disease can be cured through traditional means like plants, or by eating the raw liver or heart of the affected dog. The attitudes and practices regarding rabies were also wrong as more than a half of dog owners have not vaccinated their animals and 34.25% recommended to kill stray dogs as a mean to control rabies rather than vaccination (16.35%) and education (1.61%). In general, the population of Yaoundé have shown a better knowledge attitude and practices of the disease than those of Ngaoundéré and Garoua respectively. An association has been established between the knowledge of the issue of the disease and the localization ($p=0.00069$). The eradication of the disease being based on the appropriate knowledge of the disease, there is a need for all the different parts of the community to be involved in an establishment of a sensitization program for the population.

Keywords: Cameroon, Garoua, KAP, Ngaoundéré, rabies, Yaoundé.

INTRODUCTION

Rabies is an infectious inoculable disease caused by a lyssavirus which can affect all warm-blooded animals and which can be transmitted to human by animals especially dogs (Ribadeau et al., 2010). This disease is neglected

and endemic in many parts of the world especially in developing countries (Nel, 2013). Africa is the second affected continent, with 44% of the total human deaths due to the (Knobel et al., 2005) the majority of the victims being

under 15 years old (WHO, 2005). The management of the disease in human is linked to its management in animals (WHO, 2013) and one of the major obstacle of the surveillance is the unavailability of reliable data on the disease (Nel, 2013). This situation common to many African countries has also been noticed in Cameroon (Awah-Ndukum et al., 2002) with very few information on the disease particularly on what the population know about to disease, how they relate or react with the different sources of the virus. Hence, the objective of this research is to contribute in the understanding of the determinants of rabies in Cameroun in general, and particularly the knowledge, attitude and practices (KAP).

MATERIAL AND METHOD

The study was conducted in the cities of Yaoundé, Ngaoundéré and Garoua, the different capitals of the Centre, Adamawa and North regions of Cameroon. The characteristics of the different cities are presented in the Table 1. The sampling method used was the proportional allocation which consists of determining randomly for each area according to its weight and the number of households based on data of the national census of 2005 (BUCREP, 2010b).

The determination of the sampling size was done through a probabilistic method, particularly by a stratified random with proportional allocation method. The main population was determined based on the last population census done in 2005 with the different growth rate given for the next years up to 2013 (BUCREP, 2010a; BUCREP, 2010c). The sampling frame was constituted by removing from the main population all the people under 15 years old, whose answers are generally unreliable (Fuschs, 2009). The sampling size then was determined using the Thrusfield (2007) formula as given below:

$$n = \frac{Z^2 \cdot p(1 - p)}{e^2}$$

Where: n = required sample size (384.6), Z = a constant with a confidence level of 95% (1.96), e = error 5% and p = Proportion (prevalence) of individuals (50%, default value).

Two adjustments were subsequently done according to the stepwise guidelines of WHO (OMS, 2006). The first one (n') was done according to the gender and the class of ages. Five classes were set [15-25]; [25-35]; [35-45]; [45-55]; [55-∞] with an interval of ten. Following this first adjustment, the sample size was 3841,6. The second adjustment was the proportion of no response which was set at 20%. Following these steps, the final sample size was 4610 persons corresponding to 4610 households which was affected proportionally to the different areas. The sampling plan was made of one stratum so the

adjustment according to the number of strata was one, thus not affecting the final sampling size. The allocation of the final sampling size within the areas is summed up in the Table 2

The method used was the interview via a questionnaire of forty-five (45) questions which was elaborated by the software Epidata[®] version 2.0. This questionnaire was tested by 150 people in the city of Dang (Adamawa region) and corrected before used in the present study. A team of twenty people was trained to collect data. The questionnaire was filled directly in a one to one method. In order to ensure the reliability of data, the households were targeted and only one person selected per household. The randomly selected person was interviewed apart from the rest of the family to avoid communication during the interview. The different questionnaire were collected, encoded and analysed by the software Microsoft Excell[®] 2013. Findings were described using descriptive analysis, Pearson's Chi square and student's tests were used to show the association between outcome (KAP) and explanatory variables.

RESULTS AND DISCUSSION

Within the three zones, 1118 households were studied, one person interviewed per house, 398 in Garoua, 248 in Ngaoundéré and 472 in Yaoundé with a response rate of 44.72%. The average number of persons within each household was 4.85, 5.04 and 5.48 in Garoua, Ngaoundéré and Yaoundé respectively

As presented in Table 3 the respondents are young and under 25 years (63.86%), which can be explained by the fact that the overall population in the country is also young and less than 18 years old (BUCREP, 2005a). This result is different from the one of Tariku and Araya (2017) who have obtained only a percentage of respondents of 33.6% aged from 15 to 30 years. This can be explained by the different in demographic trend between the counties but also by the methodology the choice of respondents being different in both studies.

The results show that 88.72% of the respondents have heard about rabies. A higher percentage (99.3%) was also obtained in Ethiopia by Abdela and Teshome (2017). There is a relationship between the age and the fact of having heard about rabies (p<0.05). This relationship can be associated to the fact that the probability to heard about rabies increases with age. However, these results do not traduce a good knowledge of the disease many respondents less than 25% being able to cite the right manifestation of the disease either in animals than in men (Table 5). The same analysis was done in Chad (Mindekem et al., 2005) and Filipinos (Davlin et al., 2014) where false manifestations of the disease has been cited. The same conclusion that having heard about rabies does not traduce a good knowledge of the disease has been done by Ali et al. (2013).

Table 1. Sociogeographic characteristics of the studied areas.

Characteristics	Garoua	Ngaoundere	Yaounde
Geographical localisation	9°18'-9°37' LN 13°24'-13°60'LE	7°14'50''-7°35'50'' LN 13°29'00-13°40'70''LE	3°45'-3°59'LN 10°94'-11°58'LE
Mean Altitude	166 m	1100 m	800 m
Superficy	73km ²	106km ²	310km ²
Type of climate	Soudanean	Soudano-guinean	Equatorial
Mean rainfall	300 mm ³ /year	1 400mm ³ /year	1 564 mm ³ /
Estimated population size in 2013	256,860 inhabitants	180,763 inhabitants	1, 817,524 inhabitants
Main beliefs	Islam, Christianity, others*	Islam, Christianity, others*	Christianity, Islam, others*

*(Animism, Atheism, Buddhism...)

Source: BUCREP (2010a), MINEPAT (2010), Ngana et al. (2009) and Tchotsoua et al. (1999).

Table 2. Proportional allocation of the sampling size in the studied areas.

Studied areas	Population in areas (N)	Proportion of people under 15 years (%)	Sampling frame (nb)	Allocation or proportional weight (%)	Final sampling size
Garoua	316,641	47.80	161,170	9.82	453
Ngaoundéré	222,833	39.10	116,319	7.08	326
Yaoundé	2, 240,531	49.10	1, 364,483	83.10	3,831
Total	2, 780,005	45.33*	1, 641,972	100	4,610

*mean.

Table 3. sociodemographic characteristics of interviewed persons in the studied areas.

Variables	Garoua n (%)	Ngaoundéré n (%)	Yaoundé n (%)	Total n (%)
Gender				
Male	255 (64)	135 (54.44)	209 (44.28)	599 (53.58)
Female	143 (36)	113 (45.56)	263 (55.72)	519 (46.42)
Level of education				
None	14 (3.53)	11 (4.44)	4 (0.85)	29 (2.59)
Primary	44 (11.05)	24 (9.68)	5 (1.06)	73 (6.53)
Secondary	298 (74.87)	196 (79.03)	403 (85.38)	897 (80.23)
Higher	42 (10.55)	17 (6.85)	60 (12.71)	119 (10.64)
Religion				
Christianity	293 (73.62)	165 (66.53)	389 (82.42)	847 (75.76)
Islam	97 (24.37)	81 (32.66)	30 (6.36)	208 (18.60)
Others	8 (2.01)	2 (0.81)	53 (11.23)	63 (5.63)
Age (years)				
15-25	238 (59.80)	177 (71.37)	299 (63.35)	714 (63.86)
25-35	76 (19.10)	39 (15.73)	92 (19.49)	207 (18.52)
35-45	46 (11.56)	19 (7.66)	57 (12.08)	122 (10.91)
45-55	18 (4.52)	8 (3.23)	13 (2.75)	39 (3.49)
55 and above	20 (5.02)	5 (2.02)	11 (2.33)	36 (3.22)
Mean age (years)	26.14±12.83	23.38±9.48	24.63±10.57	24.72±10.96
Professional				
Public sector	42 (10.55)	15 (6.05)	55 (11.65)	112 (10.02)
Private sector	123 (30.90)	48 (19.35)	68 (14.41)	239 (21.38)
Jobless	30 (7.54)	24 (9.68)	104 (22.03)	158 (14.13)
Total n (%)	398 (100)	248 (100)	472 (100)	1118 (100)

Table 4. Sociodemographics characteristics of people who have heard about rabies.

Variables	Garoua N (%)	Ngaoundéré N (%)	Yaoundé N (%)	Total N (%)	χ^2 (P)
Gender					
Male	228 (89.41)	107 (79.26)	197 (94.26)	532 (88.81)	44.05 (2.75)
Female	111 (77.62)	93 (82.30)	256(97.34)	460 (88.63)	
Level of education					
None	9 (64.29)	6 (54.55)	3 (75.00)	18 (62.07)	46.58 (7.82)
Primary	34 (77.27)	10 (41.67)	3 (60.00)	47 (64.38)	
Secondary	257 (86.24)	167 (85.20)	390 (96.77)	814 (90.75)	
Higher	39 (92.86)	17 (100)	57 (95.00)	113 (94.96)	
Religion					
Christianity	254 (86.69)	140 (84.85)	378 (97.17)	772 (91.15)	93.84 (2.02)
Islam	78 (80.41)	58 (71.60)	28 (93.33)	164 (78.85)	
Others	7 (87.50)	2 (100)	47 (88.68)	56 (88.89)	
Age (years)					
15-25	199 (83.61)	143 (80.79)	288 (96.32)	630 (88.24)	16.32 (0.03)
25-35	67 (88.16)	31 (79.49)	88 (95.65)	186 (89.86)	
35-45	39 (84.78)	15 (78.95)	54 (94.73)	108 (88.52)	
45-55	15 (83.33)	7 (87.50)	12 (92.30)	34 (87.18)	
55 and above	19 (95.00)	4 (80)	11 (100)	34 (94.44)	
Profession^a					
Public sector	41 (97.62)	9 (60.00)	54 (98.18)	104 (92.86)	51.44 (1.80)
Private sector	93 (75.61)	38 (79.17)	59 (86.76)	190 (79.50)	
Jobless	27 (90.00)	17 (70.83)	98 (94.23)	142 (89.87)	
Total n (%)	339 (85.18)	200 (80.65)	453 (95.97)	992 (88.73)	

^aProfession (students of different levels removed: 56.05%).

For instance, in the present study only 3.77% of those who have heard about rabies have been able to say that all mammals can have rabies versus 73.5% in Addis-abeba (Ali et al., 2013). In the same way, 11.74% of this group have affirmed that human being can not be affected by rabies. However, 90.87% of those who have properly cited man as a sensitive specie to the disease have been able to establish the link to canine rabies citing dog biting as one of the transmissions means (Table 4). The differences observed can be explained by the fact that few studies have been conducted on rabies in Cameroon, this work being the third research on this topic and no educational program exists on the disease apart from national vaccination campaigns which are not regular.

This lack of information on the disease has been highlighted by Nel (2013) who showed that the disease in its description was generally associated to cultural interpretation and mystical action like witchcraft. On this point, this study revealed that 52.21% of people who knew about rabies also affirmed that it is curable. This result is similar to the one found in a neighbouring country, Chad in

a study conducted by Mindekem et al. (2005) in N'djamena where 63 % of people believed the same. A test of independence on the issue of the disease and the area was done and a very strong link established between the area and the belief that rabies is curable ($p=0.00069$; $P<0.05$) (Table 6). This can be explained by the fact that two of the three regions are located in the northern part of the country where the level of education and public health campaigns are generally low, compared to the third area Yaoundé, the capital of the country and one of the most developed.

Concerning the attitudes, two main points were observed. The first one was the attitude in case of an exposure to a rabid dog bite. The majority of people (54.94%) who knows about rabies recommend to go to the hospital in case of an exposure, but a high level (34.12%) saying they do not know and some (3.65%) prefer to treat the wound traditionally (Table 7). This can be explained by the fact that many of these people have never faced a rabid case but have the general knowledge that the right attitude is to go to hospital though an important part also

Table 5. Clinical signs cited by the people who have heard about rabies

Clinical signs	Garoua	Ngaoundéré	Yaoundé	Total
Animals n (%)	N=261 (76.99)	N=134 (67)	N=306 (67,55)	N=701 (70.67)
Agressiveness	135 (51.72)	63 (47.01)	100 (32.68)	298 (42.51)
Trouble of consciousness	6 (2.30)	10 (7.46)	17 (5.56)	33 (4.71)
Ptyalism	26 (9.96)	18 (13.43)	49 (16.01)	93 (13.27)
Hydrophobia	1 (0.38)	0	0	1 (0.14)
Alopecia	4 (1.53)	11 (8.21)	156 (50.98)	171 (24.39)
Thinness	14 (5.36)	0	28 (9.15)	42 (5.99)
Incurable wounds	0	0	38 (12.42)	38(5.42)
≥2 signs	67 (25.67)	43 (32.09)	78 (25.49)	188 (26.82)
>3 signs	31 (11.88)	16 (11.94)	61 (19.93)	108 (15.41)
Human n (%)	N=186 (54,87)	77 (38,50)	151 (33,33)	414 (41.73)
Agressiveness	18 (9.68)	44 (57.14)	77 (50.99)	139 (33.57)
Trouble of consciousness	104 (55.91)	9 (11.69)	36 (23.84)	149 (35.99)
Ptyalism	26 (13.98)	4 (5.19)	21 (13.91)	51 (12.32)
Hydrophobia	8 (4.30)	0	4 (2.65)	12 (2.90)
Paralysis	0	4 (5.19)	0	4 (0.97)
Incurable wounds	0	3 (3.90)	7 (4.64)	10 (2.42)
Fever	0	8 (10.38)	0	8 (1.93)
Thinness	0	0	8 (5.30)	8(1.93)
≥ 2 signs	87(46.77)	34 (44.16)	106 (70.20)	227(54.83)
≥ 3 signs	65(34.95)	13 (16.88)	31 (20.53)	109(26.33)

Table 6. Test of independence between the issue of the disease and the localisation (areas).

Areas	Issue of the disease			Df ^a	X ²	p
	Curable	Incurable	Don't know			
Garoua	190	42	107	4	19.26	0.00069*
Ngaoundéré	119	11	70			
Yaoundé	208	53	192			

a = degree of freedom; * = p<0.05.

believed in traditional means. These results are similar to the one obtained in N'djamena (Mindkem et al., 2005) where more than the half of people were preferred to go to hospital. The findings also similar to the one by Prakash et al. (2013) in Wanadam, India were 7% of the respondents said the right action is to treat it traditionally. The second attitude was regarding vaccination. 65% of the respondents (727) owned at least one dog but only 65.76% of them have effectively vaccinated their animal and no particular reason was given by those who did not (Figure 1). The residents of Yaoundé city had the higher percentage of vaccination coverage (40.78%) compare to the Ngaoundéré (11.58%) and Garoua (38.33%). This may be explained not only by a poor knowledge of the disease, but also by the availabilities of veterinary structures, the cost of the rabies vaccine which is more than 10 US\$ and the culture. The inhabitants of Yaoundé having a high

income than those of other cities (BUCREP, 2010a). This result is different from the one obtained by Sambo et al. (2014) who had a vaccination coverage of 51% by dog owners in their studies. The importance and influence of the cost of the vaccination has been proven as important in the vaccination coverage (Knobel et al., 2005) so as culture (Nel, 2013; Palamar et al., 2013).

The practices regarding the control of rabies in dog population particularly stray dogs (49.88%) have asked for a canine shelter followed by the removal of strayed dogs by killing (34.25%). However, 26.08% said they have no idea on what to do (Table 8). A free vaccination of these dogs has also been cited by 16.35% of the respondents. In general, it appears that they want a better management of these animals. This can be justified by the fact that many people see these animals as abandoned by their owners and that it is the duty of the government to manage them.

Table 7. Recommended attitudes by the inhabitants of Garoua, Ngaoundéré and Yaoundé in case of an exposure to rabies.

Actions	Garoua 304 (76.38)	Ngaoundéré N=184 (74.19)	Yaoundé 362 (76.69)	Total 850 (76.02)
Go to hospital	182 (59.87)	87 (47.28)	198 (54.70)	467 (54.94)
Go to a pharmacy	34 (11.18)	56 (30.43)	32 (8.84)	122 (14.35)
Consult a veterinarian	6 (1.97)	2 (1.09)	20 (5.52)	28 (3.29)
Bring the animal to the vet	5 (1.64)	2 (1.09)	1 (0.28)	8 (0.94)
Treat the wound and wait	8 (2.64)	3 (1.63)	2 (0.55)	13 (1.53)
Go to a specialised center	48 (15.79)	15 (8.15)	9 (2.49)	72 (8.47)
Treat traditionally	14 (4.61)	3 (1.63)	14 (3.86)	31 (3.65)
Don't know	94 (30.92)	74 (40.22)	122 (33.70)	290 (34.12)
Take antitetanic vaccine	0	1 (0.54)	2 (0.55)	3 (0.35)
Go to a friend	0	1 (0.54)	0	1 (0.11)
Vet clinic or hospital	4 (1.32)	1 (0.54)	1 (0.28)	6 (0.71)
Hospital or pharmacy	31 (10.20)	50 (35.46)	30 (8.29)	111 (13.06)
See the dog owner to verify if the dog is vaccinated	5 (1.64)	4 (2.17)	0	9 (1.06)
Wash the wound and go to the Hospital	13 (4.28)	1 (0.54)	9 (2.49)	23 (2.71)

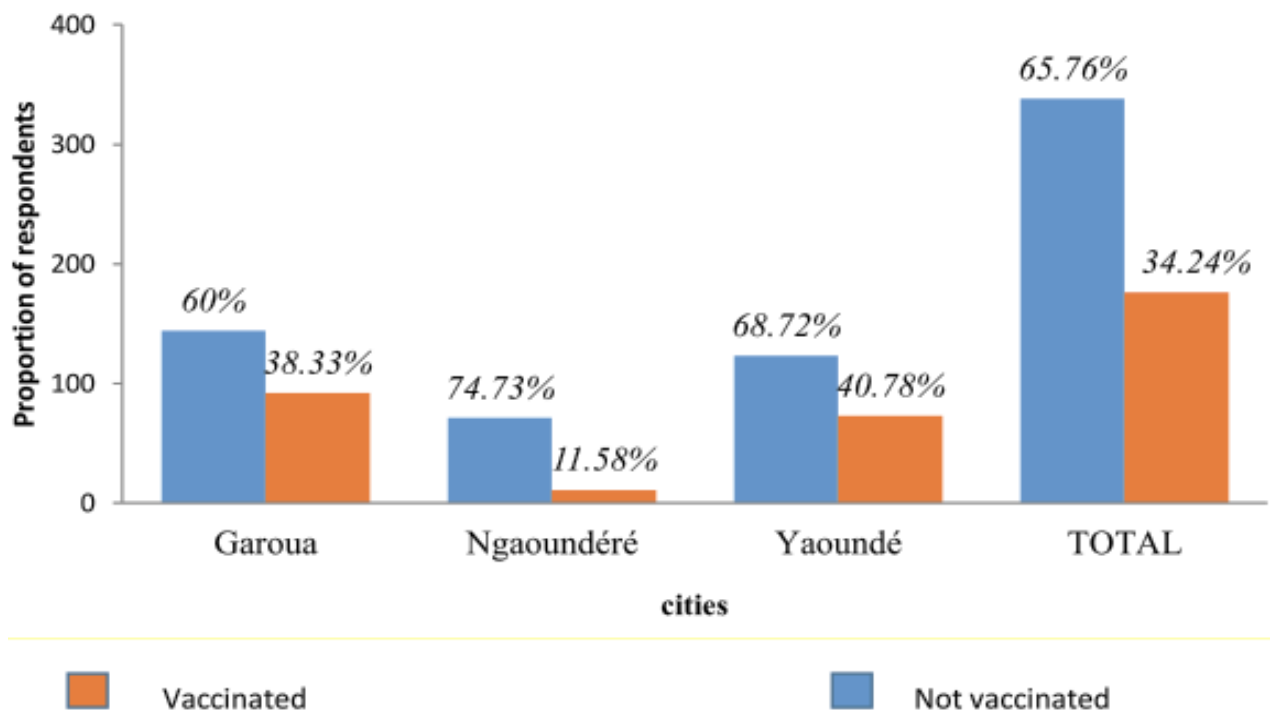


Figure 1. Trend of attitudes of dog owners regarding rabies vaccination.

However, as they are sometimes aggressive justifies why they also accept the option of killing them. These results are different from the one of Sambo et al. (2014) who in Tanzania have obtained a percentage of 79% of people for the killing of stray animals in Tanzania. The perception of

these animals and the fact they do not see them as a risk factor for rabies is also due to lack of education program as proven by Nilsson (2014) in Malawi whose study shown a change of attitude and practices towards animals after sensitization.

Table 8. Different practices proposed for the management of strayed dogs in the cities of Garoua, Ngaoundéré and Yaoundé in relation with rabies.

Actions	Garoua	Ngaoundéré	Yaoundé	Total
	n (%)	n (%)	n (%)	n (%)
	308 (77.39)	203 (81.85)	321 (68.01)	832 (74.42)
Killing	138 (44.01)	42 (20.19)	105 (32.71)	285 (34.25)
Creation of a canine shelter	83 (26.95)	106 (52.17)	226 (70.40)	415 (49.88)
Free vaccine campaigns	58 (18.83)	0	78 (24.30)	136 (16.35)
Sensitization of owners	16 (5.19)	2 (0.99)	0	18 (1.61)
Don't know	103 (33.44)	62 (30.54)	52 (16.20)	217 (26.08)
Look for their owners	0	7 (3.45)	6 (1.87)	13 (1.56)
Remove dust bean	0	0	1 (0.31)	1 (0.12)
Punish their owners	0	1 (0.49)	0	1 (0.12)
Nothing	0	28 (13.79)	4 (1.25)	32 (3.85)
2 actions	76 (26.68)	57 (28.08)	111 (34.58)	244 (29.33)
≥3 actions	31 (10.06)	21 (10.34)	43 (13.40)	95 (11.42)

Conclusion

This evaluation of Knowledge, Attitude and Practices (KAP) on rabies the first of its kind in the country has shown that the population of the studied areas has a general knowledge of the disease but not precise. If many have heard about rabies, very few can give its manifestations, ways of transmission or that it is a fatal an incurable disease. The evaluation of attitudes and practices has permitted know that very little is known on the first actions in case of a bite of a suspected dog and also that culture has a non-neglectable influence on these actions and practices. In general, the responsibility of dog owners is not perceived by the population in the control of the disease. Though these results have been obtained and permit to have an insight on the determinants, further research must be done on the risk factors, and many programs have to be developed in order to sensitise the populace on the disease in order to reduce its incidence and eradicate it.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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