

Rabies-related Knowledge, Attitudes, and Practices of Dog Owners from Three Barangays in Los Baños, Laguna, Philippines

SAMUEL BRANDO H. PIAMONTE¹ and CHRISTIAN PAUL P. DE LA CRUZ^{2*}

ABSTRACT. Rabies continues to be a health concern in the Philippines. In 2015, only 10 municipalities and one province were added to the list of rabies-free zones in the country, making a total of 35 rabies-free areas since 2008. This study was carried out to build a community-based study on rabies in three selected *barangays* (villages) in Los Baños, Laguna, Philippines. Specifically, it aimed to assess the knowledge, attitudes, and practices on rabies among dog owners. Through snowball sampling, 418 dog owners from the three *barangays* were identified and interviewed. Descriptive measures were carried out to attain the objectives of the study. It was found out that majority of the respondents have heard about rabies. However, there was an indication of limited knowledge on rabies among the dog owners, but those with higher education had relatively better knowledge on the issue. Further, attitude scores demonstrate that across personal characteristics, dog owners had a very strong positive attitude toward rabies prevention. In terms of practices, majority of respondents practiced regular feeding and dog grooming. Also, more than half of the respondents have vaccinated their dogs and confined their dogs at home, while only a quarter reported that their dogs were registered. The researchers highly recommend strengthening information, education, and communication campaigns of the municipality by having public fora and integrating the issue in health classes among educational institutions. Policies concerning pet confinement and registration must also be strengthened by integrating the issue in communication campaigns.

Keywords: *rabies, knowledge, attitudes, practices, Los Baños*

¹MA Sociology student, College of Arts and Sciences, University of the Philippines Los Baños, Laguna, Philippines

²Assistant Professor, College of Fisheries, Laguna State Polytechnic University-Los Baños Campus, Laguna, Philippines

*Corresponding author: cpdelacruz@lspu.edu.ph

INTRODUCTION

Rabies is a viral infection transmitted from animals to humans (Yousaf et al., 2012). It is primarily transmitted through saliva and other forms of direct contact from rabid animals such as dogs, cats, bats, and other mammals. Rabies is highly preventable, but it becomes fatal once it infects both animals and humans. Domestic dogs remain to be the most reported rabies reservoir among developing countries (Krebs, Smith, Rupprecht, & Childs, 2000). This is also true in the Philippines. A retrospective study by Dimaano, Scholand, Alera, and Belandres (2011) revealed that dog bites were more common than cat bites among patients diagnosed with rabies.

Mortality due to rabies in Africa and Asia was estimated to be 55,000 per year, with 44 percent of these occurring in Asia and in rural households (World Health Organization, 2005). In the Philippines, rabies is considered as a significant public health concern it accounts for the death of 200-300 Filipinos per year (Garg, 2013). The National Rabies Prevention and Control Program of the Department of Health (DOH) envisions the Philippines to be rabies-free by the year 2020. Different local government units (LUGs) and non-government organizations (NGOs) are taking part in the said program to eliminate human rabies by the target year.

Celebrated every September 28, the World Rabies Day (WRD) was established in 2007 as a response to raise awareness and mobilize resources towards the alleviation of rabies. Medina et al. (2016) reported that WRD events in the Philippines had been rising from 10 related events in 2012 to 76 events in 2015. These events focused on veterinary services such as deworming and consultations as well as information, education, and communication (IEC) activities (e.g., seminars, media forum).

Republic Act No. 9482 or the “Anti-Rabies Act of 2007” commissions the control and elimination of human and animal rabies. It also mandates the National Rabies Prevention and Control Program, a multi-sectoral committee headed by the Bureau of Animal Industry and implemented by the DOH, Department of Agriculture, Department of the Interior and Local Government, Department of Education as well as LGUs with the assistance of the Department of Environment and Natural Resources, NGOs, and people’s organization.

In the Municipality of Los Baños, Ordinance No. 2015-1449 (“An Ordinance Adopting the Republic Act 8485 otherwise known as the ‘Animal Welfare Act of 1998’ in the Municipality of Los Baños”) is the body of all of the initiatives undertaken pertaining to animal welfare.

In terms of programs, the Local Government of Los Baños conducts free vaccination annually for each barangay. Also, a caravan bringing public address system roams around the municipality. Previously, roaming dogs were caught and housed at the dog pound. However, due to the limited number of cages, this could not be conducted at present. There is only one recorded case of rabies in Los Banos in the past five years. This occurred in April 2017.

Only a few localities in the country were declared rabies-free as of 2015. From 2008 to 2015, the following zones were declared as rabies-free: Siquijor in 2008; Batanes and Apo Island (Dauis, Negros Oriental) in 2010; Malapascua Island (Cebu) and Camotes Island (Cebu) in 2011; Biliran (Limasawa, Southern Leyte), Marinduque, and Camiguin in 2012; Guimaras, Olympia Island (Negros Oriental), Busuanga, Culion and Coron (Palawan), and Boracay Island (Aklan) in 2013; Alabat (Quezon), Socorro (Surigao del Norte), and Linapacan, Kalayaan, Cagayancillo, Magsaysay, Araceli, and Cuyo (all in Palawan) in 2014. The following were added in 2015: Tingloy Island in Batangas; Agutaya in Palawan; Basilisa, Cagdianao, Dinagat, Dinagat, Libjo, Loreto, San Jose, and Tubajon in Dinagat Islands; and the Province of Dinagat Islands (Bureau of Animal Industry, 2015).

Generally, this research aimed to build a community-based study on the issue of rabies. More specifically, this study was geared toward determining the level of rabies-related knowledge, attitude, and practices of dog owners in three selected lakeshore *barangays* (villages) in Los Baños, Laguna, Philippines.

METHODOLOGY

Research Site

Three adjacent lakeshore villages in the Municipality of Los Baños, Laguna, Philippines were considered as research locales. These were Barangay Mayondon, Barangay Bayog, and Barangay Malinta. Because the study only focused on these three *barangays*, the findings are not conclusive of the knowledge, attitude, and practices of all dog owners in Los Baños.



**Figure 1. The research site of the study
(Source: Google Maps)**

Respondents

Due to the unavailability of a list of all dog owners at the Los Baños Municipal Office, snowball sampling was utilized for this study. Interview respondents were identified through referral from their acquaintances and neighbors, who are dog owners. Four hundred and eighteen ($N=418$) dog owners from the three *barangays* willingly participated in the research.

All interviewees had the right to withdraw at any stage of the data collection procedure. They were assured that their identity and answers would be strictly kept anonymous and confidential.

Data and Method

Survey method was used to collect data from the respondents. An interviewer-assisted structured questionnaire served as a guide. The survey instrument was divided into four parts: socio-demographic characteristics, knowledge on rabies, attitudes on rabies and roaming dogs, and dog care practices. Prior to the conduct of the survey, the questionnaire was pretested to ensure that potential respondents would

have a clear understanding of the questions. The survey instrument was presented in English with Filipino translation. Finally, experts from the veterinary field were consulted to establish the validity of questions.

The measure of knowledge on rabies was divided into symptoms (ten items), modes of transmission (three items), reservoirs (eight items), and measures of prevention (three items), or a total of 24 items on knowledge. Grouping the scores equally into three yielded three categories. Scores from 0 to 8 denote low level of knowledge; 9 to 16 indicate moderate level; and 17 to 24 indicate high level of knowledge. Respondents were asked directly what they know about the disease in terms of these parameters.

Dummy choices, which are those that are not true to the disease, were also added in order to eliminate response bias. Selecting the dummy choices yield to incorrect response.

Five statements were presented to measure attitudes on rabies and roaming dogs. The respondents chose an appropriate response category that best described their opinion on the given statements. Answers ranged from one to five: 1 - strongly disagree, 2 - disagree, 3- neither agree nor disagree, 4 - agree, and 5 - strongly agree.

Lastly, practice of dog caring was measured by asking directly the participants if they regularly feed and confine their dogs at home, and if they have already registered and vaccinated their dogs.

Analysis of Data

One limitation of non-random samples is that statistical inferences cannot be estimated (Banerjee & Chaudhury, 2010). Lájer (2007) concluded that inferential statistics do not provide reliable results when applied to non-random samples. Since non-random sampling was employed due to the absence of a sampling frame, the study is limited to the use of descriptive measures in analyzing data.

Frequencies and proportions were computed to identify knowledge gaps, while means were computed to determine differences in the knowledge scores. Pearson correlation coefficient was performed to identify correlates of knowledge scores. Median was used as measure of central tendency to identify average attitude scores. Spearman rho was computed for correlates of attitude scores, while proportions were computed for practices.

RESULTS AND DISCUSSION

Socio-demographic Profile of Respondents

The socio-demographic characteristics of the 418 dog owners, who took part in the study are summarized in Tables 1 and 2. Frequency distributions of categorical variables are presented in Table 1, while means and standard deviations of numerical data are shown in Table 2.

More than half (57%) of the respondents were female. Mean age was 43 years old ($SD=15.35$) indicating that the respondents were generally middle aged. Moreover, about one-third (32%) of the respondents attained high school education. More than half (55%) of the respondents were employed. Average household size was five ($SD=2.32$).

Table 2 shows that the number of dogs owned by the respondents ranged from one to seven dogs with an average of two dogs ($SD=1.19$). The number of years the survey participants have been raising dogs spanned widely from one month to 62 years with eight years being the average ($SD=9.51$).

Reasons for keeping dogs at home varied among the owners. Forty-four percent said that they keep dogs to guard the family's house. Twenty-eight percent reported that aside from having a guard for the house, they also keep dogs as pets. Meanwhile, 26 percent said that they keep dogs only for pet purposes. Finally, very few indicated that aside from these reasons, they also keep dogs for business (e.g., selling them).

Knowledge on Rabies

Majority (95%) of the respondents have heard about rabies. The community was found to be the primary source of information on the said issue (58%), followed closely by media with a very slight difference (58%). Less than half (42%) of the respondents chose family members as sources of information. A relatively low percentage was recorded for the government (21%), schools (18%), veterinary clinics (14%), and hospitals (13%). The interviewees were also asked if they have heard about dog registration in their municipality, and about 69 percent gave an affirmative response.

Table 3 shows the choices from which the respondents were asked to pick the correct symptoms, transmission, and prevention of

Table 1. Respondents' socio-demographic characteristics

VARIABLE	NO.	%
Sex		
Male	179	42.9
Female	238	57.1
Education		
Never attended	3	0.8
Elementary level	9	2.2
Elementary graduate	40	10.0
High school level	51	12.7
High school graduate	129	32.2
College level	91	22.7
College graduate	78	19.4
Employment		
Employed	228	54.9
Unemployed and non-gainfully employed	187	45.1

Note: Total frequencies differ due to the No Response item or missing data

Table 2. Mean and Standard Deviations of age, household size, number of dogs owned, and number of years raising dogs

VARIABLE	MEAN	STANDARD DEVIATION
Age	43	15.35
Household size	5	2.32
Number of dogs owned	2	1.19
Number of years raising dogs	8	9.51

Note: Total frequencies differ due to the No Response item or missing data

rabies as well as the corresponding frequencies and percentages of respondents who picked the items correctly.

Only excessive salivation (70%) and aggression (62%) were recognized by the majority as symptoms of a rabid dog. Most of the respondents did not indicate overeating and overdrinking as symptoms of rabies, which imply that majority of the dog owners were knowledgeable that these are not symptoms of rabies.

Only a bite from an infected dog was the popular choice (92%) as mode of transmission for rabies. In addition, dogs are the most popular rabies reservoir among the choices with majority of the respondents (87%) identifying correctly the animal. With a slight difference, cats were also recognized by majority (83%) as potential carriers of rabies. In addition, the dummy item was correctly answered by majority (84%) of the respondents indicating that they know snakes cannot transmit rabies.

Lastly, about 76 percent and 68 percent, respectively, knew that having vaccines and preventing dog bites are means of rabies prevention. However, less than half (41%) of the respondents stated that confining pets at home helped in preventing rabies transmission.

Differences in mean knowledge scores are presented in Table 4. Over all, the respondents demonstrated a moderate level of knowledge regarding rabies ($\bar{x}=10.18$, $s=3.38$). A very slight difference on the average number of correct items identified can be observed between sexes and employment statuses. Specifically, females had slightly higher score ($\bar{x}=10.24$, $s=3.34$) than males ($\bar{x}=10.12$, $s=3.47$), while employed dog owners had slightly better knowledge score ($\bar{x}=10.19$, $s=3.33$) than those who were unemployed and non-gainfully employed ($\bar{x}=10.17$, $s=3.43$). However, the differences can be considered as negligible.

Across educational attainments, dog owners who never attended schooling had the lowest knowledge score ($\bar{x}=4.66$, $s=4.04$). On the other hand, those who were more knowledgeable about rabies were respondents with college degrees ($\bar{x}=10.87$, $s=3.61$), followed by respondents who only earned some units in college with a very slight difference ($\bar{x}=10.84$, $s=3.54$).

Table 3. Frequency counts and percentages of correct answers per item

ITEMS	NO.	%
Symptoms		
Aggressive	259	62.0
Restless	151	36.2
Biting	137	32.8
Strange howling	62	14.8
Overeating ^b	391	93.5
Overdrinking ^b	366	87.6
Seem to look normal (asymptomatic)	43	10.3
Trembling	63	15.1
Depressed	68	16.3
Excessive salivation	291	69.6
Transmission of rabies		
Bite from infected dog	385	92.1
Lick on open wound	185	44.4
Scratch	74	17.7
Rabies reservoir		
Dogs	363	86.8
Cats	346	82.8
Carabaos	7	1.7
Snakes ^b	350	83.7
Pigs	12	2.9
Rats	162	38.8
Bats	45	10.8
Cattles	6	1.4
Prevention of rabies		
Prevent dog bites	285	68.2
Vaccines	320	76.6
Confine to home	172	41.2

^bDummy choices

Table 4. Mean knowledge scores of respondents

ITEMS	$\bar{x}$	s
Over-all	10.18	3.38
Sex		
Male	10.12	3.47
Female	10.24	3.34
Education		
Never Attended	4.66	4.04
Elementary Level	9.88	3.30
Elementary Graduate	9.32	3.39
High School Level	9.58	3.09
High School Graduate	9.74	2.73
College Level	10.84	3.54
College Graduate	10.87	3.61
Employment		
Employed	10.19	3.33
Unemployed and Non-gainfully Employed	10.17	3.43

Table 5. Correlation matrix of numerical variables and knowledge score

ITEMS	AGE	NUMBER OF DOGS OWNED	NUMBER OF YEARS RAISING DOGS	KNOWLEDGE SCORE
Age	1.000			
Number of Dogs Owned	0.005	1.000		
Number of Years Raising Dogs	0.037	0.249	1.000	
Knowledge Score	-0.027	-0.092	-0.028	1.000

Table 5 presents the numerical correlates of knowledge scores. Observed correlation coefficients denote negative linear relationships among variables. Knowledge score was negatively associated with age ($r=-0.027$), number of dogs owned ($r=-0.092$), and number of years raising dogs ($r=-0.028$). However, the values were near zero, which means that the strength of correlation coefficients was very weak and might be considered negligible (Mukaka, 2012).

Attitudes toward Rabies and Rabies Prevention

Table 6 indicates median attitude score regarding statements on rabies and rabies prevention. Median scores show that all the interviewed dog owners had strong agreement attitudes on the statements provided. As indicated by the median values, the interviewed dog owners strongly agreed on the importance of informing others about the risk of rabies. They also had a very strong evaluation of rabies as a public health issue. Moreover, dog owners had a very strong positive stance toward roaming dogs being captured and reported. Results were consistent across different characteristics; thus, no difference in the attitudes could be found between sexes, employment statuses, and across highest educational attainments.

Meanwhile, Table 7 presents the correlation matrix between attitude scores and age, number of dogs owned, and length of raising dogs in years. Spearman rho coefficients illustrate very weak linear correlations between median attitude scores and respondent characteristics except for number of years raising a dog and attitude towards capturing roaming dogs ($r=0.254$) as well as number of dogs owned and attitude about informing others on the risks of rabies ($r=0.222$). A relatively stronger linear relationship can be illustrated as compared with other correlation coefficients. Specifically, dog owners who have more experience in raising dogs agreed more that roaming dogs must be captured, and those with more dogs had a more positive stance about informing others on the risks of rabies. Similar to the correlates of knowledge scores, many values were very close to zero and might be considered negligible (Mukaka, 2012).

Table 6. Median attitude scores of respondents

	It is a must to inform others of rabies' risks.	Rabies is a public health concern.	Roaming dogs must be captured.	Roaming dogs must be reported.	It is a must to inform officials of dog biting incidence.
Over-all	5	5	5	5	5
Sex					
Male	5	5	5	5	5
Female	5	5	5	5	5
Education					
Never Attended	5	5	5	5	5
Elementary Level	5	5	5	5	5
Elementary Graduate	5	5	5	5	5
High School Level	5	5	5	5	5
High School Graduate	5	5	5	5	5
College Level	5	5	5	5	5
College Graduate	5	5	5	5	5
Employment					
Employed	5	5	5	5	5
Unemployed and Non-gainfully employed	5	5	5	5	5

Table 7. Correlation matrix of numerical variables and attitude scores

	Age	Number of dogs owned	Number of years raising dogs	It is a must to inform others of rabies' risks.	Rabies is a public health concern.	Roaming dogs must be captured.	Roaming dogs must be reported.	It is a must to inform officials of dog biting incidence.
Age	1.000							
Number of dogs owned	0.106	1.000						
Number of years raising dogs	0.161	0.315	1.000					
It is a must to inform others of rabies' risks.	-0.125	0.222	0.120	1.000				
Rabies is a public health concern.	0.191	0.089	0.149	0.280	1.000			
Roaming dogs must be captured.	-0.066	0.136	0.254	0.372	0.573	1.000		
Roaming dogs must be reported.	0.005	0.087	0.097	0.283	0.468	0.690	1.000	
It is a must to inform officials of dog biting incidence	0.103	0.080	0.196	0.347	0.388	0.475	0.667	1.000

Practices on Dog Care

Table 8 presents the frequency distribution of various dog care practices. Majority of the owners practiced regular dog feeding (99%) and dog grooming (90%). Meanwhile, a lower percentage reported dog vaccination (69%) and dog confinement (51%). Lastly, dog registration (27%) was the least performed dog care practice.

Table 8. Summary of frequencies and percentages on dog care practices

PRACTICES	NO.	%
Dog feeding (N=401)	396	98.8
Dog grooming (N=401)	360	89.8
Dog vaccination (N=409)	284	69.4
Dog confinement (N=406)	209	51.5
Dog registration (N=411)	111	27.0

Note: There are different Ns because of the No Response item.

Discussion

Rabies is an important health problem that needs attention. To the knowledge of the researchers, this is the first study that dealt with the knowledge, attitude, and practices of Los Baños dog owners toward rabies.

The dog owners demonstrated a moderate level of knowledge about rabies. No large differences on knowledge between various personal characteristics was found except on educational attainment. Those who had college units and college degrees were more knowledgeable on rabies relative to those who never attended school. Similar studies also yielded the same result that those who had greater education are more likely to have better knowledge about rabies (Haimbodi, Mavengwa & Noden, 2014; Sambo et al., 2014). Dog owners who have attended schooling longer may have had the opportunity to learn further about rabies.

Only aggression and excessive salivation were highly recognized as symptoms of rabies. The finding that most of the respondents did not know that rabid dogs can still look normal is alarming because it can put them at risk whenever they interact with dogs that seem to look normal. Rabies can also be transmitted through scratches (Hankins & Rosekrans, 2004). However, many participants failed to recognize this mode of transmission; thus, another knowledge gap must be filled. Also, it should be noted that only mammals can transmit rabies (Klosterman, 2008). Among the enumerated rabies reservoir, the dog owners only recognized dogs and cats as potential reservoir but not the other mammals presented on the questionnaire.

On the other hand, respondents across different personal characteristics displayed a strong positive attitude toward rabies prevention. Interestingly, respondents strongly agreed that roaming dogs were annoying and should be captured and reported; yet only about half reported to be confining the dogs at home. This is a clear violation of Section 5 of the Anti-Rabies Act of 2007. In the said section (Responsibilities of Pet Owner), all pet owners are required to not allow the dogs to roam in public without a leash.

Furthermore, among the pet care practices, dog registration was the least practiced, which indicates that something needs to be done in terms of pet registration. Part of the responsibilities of pet owners is to submit the dogs for mandatory registration. In addition, the low prevalence of the practice can be attributed to the finding that only a moderate percentage of dog owners had heard about it.

CONCLUSIONS AND RECOMMENDATIONS

Good knowledge on the dynamics of rabies, positive attitude toward rabies prevention, and proper pet care practices of the community members will help the Municipality of Los Baños strengthen the Anti-Rabies Act of 2007. Particularly, these will help attain the mandate of the act, such as to control, prevent, and eradicate human and animal rabies.

However, there is an existing knowledge gap among the dog owners on the issue of rabies, particularly on its symptoms. Major sources of information pertaining to the issue are the community itself and the mass media, but not the government and schools. In addition, the pet owners generally had a strong positive attitude toward rabies

prevention. In terms of practices, dog registration was the least practiced where only a quarter reported to have done so.

Results of the study thus point to the following recommendations:

First, the authors suggest that a database of dog owners be established through the Municipal Agriculture Office for monitoring purposes. Furthermore, it will allow random selection of participants for future surveys; thus, generalization of research results will be possible.

Second, since findings indicate that the government and schools ranked low among the sources of information about rabies, the researchers recommend that responsible pet ownership in general and rabies prevention, in particular should be integrated in health classes among educational institutions. Moreover, having community education on rabies, strengthening governmental advocacy and policies, and following effective information dissemination programs are recommended.

The municipality can also utilize Rabies Educator's Certificate (REC), an online free course about rabies issued by the Global Alliance for Rabies Control. As of May 2017, there are only about 600 REC graduates in the country. The Local Government of Los Baños can recommend it to university professors, school nurses, and health workers to disseminate life-saving information regarding the disease. Finally, policies concerning dog confinement and registration must also be strengthened by informing the community about the importance and mandatory implementation of these practices.

Hence, this study concludes with the hope that the Municipality of Los Baños will pursue strong local government interventions including wide information dissemination to address knowledge gaps and strong policy implementation to ensure proper dog care practices. With these, Los Baños may consequently be declared as a rabies-free municipality by 2020.

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