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RESEARCH NOTE

KNOWLEDGE AND PRACTICES REGARDING RABIES AND RESPONSIBLE DOG OWNERSHIP IN PANGLAO ISLAND, BOHOL, PHILIPPINES

Emerson P. Tapdasan and Caro B. Salces

ABSTRACT

Rabies disease claims 200-300 human deaths in the Philippines per year, mostly due to bites from infected dogs. Considered as the leading tourist destination in Bohol province, Panglao Island ironically had the highest canine rabies incidence in 2013. This study aimed to describe the people's knowledge and practices regarding rabies and responsible dog ownership (RDO) components [annual vaccination against rabies, dog registration, dog leashing or confinement and dog neutering]. A cross-sectional study was conducted to descriptively and inferentially analyze the results using Odds Ratio at 95% confidence interval. Although most were aware about the rabies disease and RDO, only 58% of owners had their dog's vaccination updated. Furthermore, less than half of owners had their dogs registered (44%), leashed/ confined (37%) and neutered (13%). Mongrels and those not kept as pets were more likely free-roaming. Dogs were more likely to be vaccinated if they were purebred, regularly checked by a veterinarian and aged >1 year old. Majority of the people in the island had the right knowledge and practices regarding rabies disease except for updating of dog's anti-rabies vaccination. Moreover, other than vaccination, only a few knew and practiced the components of RDO. There is a need to campaign for regular rabies vaccination and promote RDO as well.

Key words: knowledge and practices, Panglao Island, rabies, ownership

INTRODUCTION

Rabies is an acute and fatal viral disease that infects domestic and wild animals and is transmissible to humans (Knobel *et al.*, 2005; Sugiyama and Ito, 2007; Wilde *et al.*, 2012). Most humans become infected with rabies through bites from infected dogs (CDC, 2011; Meltzer and Rupprecht, 1998; Warrel and Warrel, 1995). Although rabies is 100% preventable, it is responsible for over 55,000 human deaths every year (FAO, 2011). In the Philippines, the Department of Health (2012) reported that rabies continues to be a public health problem with 200-300 human deaths per year.

Located in Bohol province, Panglao Island is one of the Philippines' premium tourist destinations. However, its thriving tourism industry could be hampered by rabies incidence that has affected dog populations with consequent human bite victims. In the year 2013 alone, 12 confirmed and suspected canine rabies cases were recorded in the 2 towns of Panglao Island (Dauis and Panglao) with a cumulative canine rabies incidence of 3 per 1,000 dogs (OPV, 2014).

The series of canine rabies incidence in Panglao Island could have been due to poor compliance of the majority of dog owners to RDO. It is empirical to assess the compliance of dog owners to the components of RDO namely, annual vaccination of dogs against rabies, dog registration, dog leashing or confinement and dog neutering.

Philippine Carabao Center at Ubay Stock Farm, Lomangog, Ubay, 6315 Bohol, Philippines (e-mail: emtapz@yahoo.com.ph).

These responsibilities of dog owners are stipulated in Republic Act No. 9482 (*Anti-Rabies Act of 2007*) and in Bohol Provincial Ordinance No. 2007-012 (*Strengthening the Bohol Rabies Prevention and Eradication Program*). It is believed that if only all dog owners are compliant to RDO as mandated by law, there would be zero rabies incidence not only in Bohol island but throughout the country as well. Likewise, it is highly important to assess the knowledge and practices of non-dog owners regarding rabies and RDO as everyone, regardless of dog-ownership status, could be affected by this dreaded disease. Although a study by Domingo and Mananggit (2014) on animal rabies patterns and implications for disease control had already been conducted, it is essential to conduct this study in Panglao Island to provide a scientific basis in refining the island's rabies prevention and elimination program particularly in the areas of Information, Education and Communication (IEC) campaign, vaccination activities, dog population control, implementation of anti-rabies laws and corresponding budgetary requirements to effectively prevent future canine rabies outbreaks. It was hypothesized that majority (>50%) of the people in Panglao Island had poor knowledge and practices regarding rabies and RDO.

This study aimed to describe the knowledge and practices (KP) of people regarding rabies and RDO in Panglao Island, determine the association between people's knowledge and practices regarding rabies and RDO, and identify determinants associated with dog vaccination.

MATERIALS AND METHODS

A cross-sectional study was conducted using a structured questionnaire to capture information about people's knowledge and practices regarding rabies and RDO. The study population was the dog owning and non-dog owning households in Panglao Island. A complete list of these households was obtained from the Municipal Agriculturist Offices (MAO) of the municipalities of Dauis and Panglao.

Sampling proportional to size and simple random sampling of all households in 22 barangays (villages) of Panglao Island were used to recruit respondents of this study. The sample size of 400 households was computed using the epidemiological software for veterinary medicine (Win Episcope® version 2.0) with the following assumptions: expected prevalence of 50%, accepted error of 5% and confidence level of 95%.

All data obtained in this study were recorded and numerically coded and entered into appropriate files using a computer spreadsheet (MS Excel®). Raw data were then imported to a public domain statistical software for epidemiology (Epi-Info® version 3.5.4) for statistical analysis. The study descriptively analyzed the knowledge and practices of respondents regarding rabies and RDO. Inferential statistics was employed to determine association between knowledge and practices of people on rabies and RDO and identify determinants associated with dog vaccination.

RESULTS and DISCUSSION

A high proportion (30%) of the respondents was 36-45 years old (Table 1). Majority had only attained primary (38%) or secondary (36%) education, and most (38%) had an average monthly income of ≤ Php 5,000.00.

Majority (96%) of people in Panglao Island have heard about rabies and have some

knowledge about the disease (86%) such as the species affected and the virus' mode of transmission (Table 2). More than half (63%) of them were also aware about the existence of national and local anti-rabies laws. A greater part of the population (84%) would report a dog biting incidence to proper authorities such as barangay officials and the MAO. A big proportion (76%) would also seek post-exposure prophylaxis (PEP) if bitten by a dog and would subject the biting animal under observation for a couple of weeks to ascertain its health condition. Moreover, a relatively high proportion (72%) of dog owners has had their dogs vaccinated. However, only 58% have had their dog's anti-rabies vaccine updated, or vaccinated within the past 12 months.

A great majority (92%) of people had correct knowledge about RDO such as anti-rabies vaccination, dog registration, leashing/ confinement, liability of owner in case of dog bite incidence and neutering (Table 2). Majority (68%) of household respondents knew that vaccination is one of the components of RDO, however, only a few knew that leashing or confinement (36%), registration (39%) and neutering (11%) of dogs are also part of RDO.

With regards to actual practices on RDO, 49% of the dog owner respondents said that they have provided their dogs with clean food and water, exercise and bath, while only 44% have had their dogs registered with the barangay council, 37% have had their dogs leashed or confined and only 13% have had their dogs neutered (Table 2). The main reason for the latter action is when owners do not intend these animals to breed and multiply.

Table 1. Respondents' characteristics (N=400).

Variables		All respondents (%)	Dog owners only (%)
No. of respondents		400 (100)	150 (37)
Sex	Male	224 (56)	80 (53)
	Female	176 (44)	70 (47)
Age	≤ 25 yrs. Old	24 (6)	11 (7)
	26-35 yrs. Old	53 (13)	18 (12)
	36-45 yrs. Old	121 (30)	50 (33)
	46-55 yrs. Old	84 (21)	29 (19)
	56-65 yrs. Old	56 (14)	20 (13)
	≥66 yrs. old	62 (16)	22 (15)
Education	Primary	153 (38)	44 (29)
	Secondary	143 (36)	57 (38)
	Tertiary	96 (24)	47 (31)
	Vocational	4 (1)	1 (1)
	No formal education	4 (1)	1 (1)
Average monthly income in Philippine Peso	≤5,000	133 (33)	43 (29)
	5,001-10,000	99 (25)	36 (24)
	10,0001-20,000	31 (8)	19 (13)
	≥20,001	19 (5)	11 (7)
	Not disclosed	118 (30)	41 (27)

Respondents whose educational attainment was up to elementary level and whose monthly income is ≤ Php 5,000.00, were less likely to own dogs (OR=0.5; CI=0.34-0.81 and OR=0.6; CI=0.37-0.98 respectively) (Table 3). Moreover, people that have attained elementary education only were less likely to know about rabies (OR=0.25; CI=0.09-0.73). In addition, respondents with monthly income of ≤ Php 5, 000.00 were less likely to report a dog bite incidence to proper authorities (OR=0.5; CI=0.25-0.93). Ironically, those who were aware about the existence of rabies laws were less likely to subject the dog to an observation period after it has bitten a person (OR=0.54; CI=0.30-0.97). They knew about the existence of anti-rabies laws, however, they did not know that those laws mandate all dog owners to subject the dog to an observation period after it has bitten a person. Reasonably, those who were aware about the existence of anti-rabies rabies laws, both dog owners and non-dog owners, were more likely to know about the concept of RDO (OR=1.5; CI=1.08-2.53 and OR=3.08; CI=1.23-7.69 respectively).

On the other hand, mongrels (OR=9.70;CI=2.85-33.00) and those that were not kept as household pets were more likely to be free-roaming as compared with purebreds and those that were kept as household pets (OR=0.22; CI=0.11-0.42) (Table 3). In addition, mongrels were less likely to be brought to a veterinarian on a regular basis (OR=0.19; CI=0.08-0.43) (Table 3). Contiguously, mongrels (OR=0.22; CI=0.07-0.78) and those aged ≤1 year (OR=0.23; CI=0.13-0.41) were less likely vaccinated against rabies than purebred ones and those aged ≥1 year (Table 4). Meanwhile, dogs regularly checked by a veterinarian were almost 7 times (CI=2.54-17.28) more likely to have had an anti-rabies shot and were 5 times (CI=2.31-10.58) more likely to be current on vaccination.

Table 2. Respondents' knowledge and practices regarding rabies and RDO.

Knowledge on Rabies	Heard about rabies (n=400)	383 (96%)
	Correct knowledge about rabies transmission(n=383)	328 (86%)
	Aware about anti-rabies law (n=400)	252 (63%)
Practices on Rabies	Seek post-exposure prophylaxis if bitten by a dog (n=400)	304 (76%)
	Report dog bite incidence to authorities (n=400)	337 (84%)
	Observe the dog after it has bitten a person (n=400)	328 (82%)
	Dogs were vaccinated against rabies (n=141)	101 (72%)
	Dog's anti-rabies vaccination was updated (n=141)	83 (58%)
Knowledge on RDO	Correct knowledge about RDO (n=264)	244 (92%)
	Vaccination as component of RDO (n=264)	180 (68%)
	Leashing as component of RDO (n=264)	96 (36%)
	Dog registration as component of RDO (n=264)	103 (39%)
	Neutering as component of RDO (n=264)	29 (11%)
Practices on RDO (Dog owners only)	Dogs were registered (n=150)	66 (44%)
	Dogs were leashed/confined (n=150)	56 (37%)
	Dogs were neutered (n=150)	19 (13%)
	Clean food and water, exercise and bath were provided (n=150)	73 (49%)

Table 3. Significant associations among factors regarding rabies and responsible dog ownership in Panglao Island, January 2014.

Exposure Factor		No. of respondents (%)	Odds Ratio (95% CI)
Dog ownership			
Education	Primary	157 (39)	0.5 (0.34 - 0.81)
	≥Secondary	243 (61)	Reference
Ave. monthly income	≤ PhP 5,000	133 (47)	0.6 (0.37 - 0.98)
	> PhP 5,000	149 (53)	Reference
Heard about rabies			
Education	Primary	157 (39)	0.25 (0.09 - 0.73)
	≥Secondary	243 (61)	Reference
Reporting of dog bite incidence			
Ave. monthly income	≤ PhP 5,000	133 (47)	0.5 (0.25 - 0.93)
	>PhP 5,000	149 (53)	Reference
Subjecting dog under observation after biting incidence			
Awareness about rabies laws (all respondents)	Aware	252 (63)	0.54 (0.30 - 0.97)
	Not aware	148 (37)	Reference
Awareness about RDO			
Awareness about rabies law (all respondents)	Aware	252 (63)	1.65 (1.08 - 2.53)
	Not aware	148 (37)	Reference
Awareness about rabies law (dog owners only)	Aware	93 (66)	3.08 (1.23 - 7.69)
	Not aware	48 (34)	Reference
Dogs were free-roaming			
Dog's breed	Mongrel	238 (89)	9.70 (2.85 - 33.00)
	Purebred	28 (11)	reference
Purpose of dog	Pet	62 (23)	0.22 (0.11 - 0.42)
	Household guard	204 (77)	reference
Regularly checked by a veterinarian			
Dog's breed	Mongrel	238 (89)	0.19 (0.08 - 0.43)
	Purebred	28 (11)	reference

Only 58% of dog owners in Panglao Island have had their dog's vaccination updated. According to Coleman and Dye (1996), the World Health Organization recommends that 70% of dogs should be immunized to eliminate or prevent outbreaks of rabies. In addition, only a few people in Panglao Island knew that leashing or confinement of dogs, registration and neutering are part of RDO. The Philippine anti-rabies law states that aside from having their dogs vaccinated against rabies, all dog owners are required to submit their dogs to mandatory registration; not allow them to roam the streets or

Table 4. Determination of rabies vaccination in Panglao Island, January 2014.

Exposure Factors		No. of dogs (%)	Odds Ratio (95% CI)
Dog had history of vaccination against rabies			
Dog's age	≤1 yr. old	71 (27)	0.23 (0.13-0.41)
	>1 yr. old	195 (73)	Reference
Dog's breed	Mongrel	238 (89)	0.22 (0.07-0.78)
	Purebred	28 (11)	Reference
Frequency of visit to veterinary	Regular	58 (22)	6.62 (2.54-17.28)
	Not regular	208 (78)	Reference
Dog's anti-rabies vaccination was current			
Dog's age	≤1 yr. old	71 (27)	0.35 (0.20-0.61)
	>1 yr. old	195 (73)	Reference
Frequency of visit to veterinarian	Regular	58 (22)	4.94 (2.31-10.58)
	Not regular	208 (78)	Reference

any public places without a leash; provide them with proper grooming, adequate food and clean shelter; within 24-hours, report immediately any biting incident involving their dogs to the concerned officials for investigation and place such dog under observation; and assist the dog bite victim immediately and shoulder the medical expenses incurred. Moreover, according to the Philippine Animal Welfare Society (2016), responsible owners would neuter their pets to avoid unwanted pregnancies and to keep them to a number that they can provide for. Likewise, the American Veterinary Medical Association (2016) claimed that controlling pet's reproduction, through managed breeding, containment or neutering, is one of the components of responsible pet ownership. With only 37% of dog owners who said they have had their dogs leashed, problem on stray dog population will persist if this issue is not addressed effectively.

Furthermore, the unlikelihood of people (particularly those who are aware about the existence of anti-rabies laws) to subject the dog to an observation period after it has bitten a person could suggest that this provision in the law was not highly disseminated. The importance of subjecting the biting animal to an observation period lies in the bite management wherein according to WHO (2010), PEP may be discontinued if the animal involved is a dog that remains healthy for an observation period of 10 days after the exposure occurred. In the Philippines, the Department of Health (2012) said that PEP on day 28 may be omitted if the biting animal is alive and remains healthy after the 14-day observation period.

This study also revealed that only dogs aged ≥1 year were more likely to be vaccinated against rabies. However, the World Health Organization Regional Office for Southeast Asia (2013) recommended that dogs should be vaccinated against rabies starting at 3 months of age. Lembo *et al.* (2010) also reported that rabies vaccines can safely be administered to dogs even at less than 3 months old.

Majority of people in Panglao Island have the right knowledge and practices regarding rabies except on the practice of updating the dog's anti-rabies vaccination. In

addition, a big proportion of the people had correct knowledge about RDO, particularly dog vaccination. However, only a few knew and practiced the other components of RDO particularly dog registration, leashing/ confinement and neutering. Based on the results of the current study, the following are recommended: to strengthen rabies IEC campaign especially to lower-income families and those with lower educational attainment (elementary and below); to make people aware that a dog which had bitten a person must be subjected to a 14-day observation period as mandated by law; to increase vaccination coverage, including dogs at least 3 months of age; to highlight and promote RDO particularly dog registration, leashing/ confinement and neutering; and to have a sustainable advocacy campaign on creating awareness that all dogs – regardless of breed – should be regularly checked by a veterinarian and vaccinated against rabies.

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