ORIGINAL ARTICLE

Rabies preventive behaviors of dog owners in Nakhon Pathom Province of Thailand

Keiko Akai[1], Jiraporn Chompikul[2] and Cheerawit Rattanapan[2]

[1] *M.P.H.M., ASEAN Institute for Health Development, Mahidol University*
[2] *Ph.D., ASEAN Institute for Health Development, Mahidol University*

Corresponding author: *Jiraporn Chompikul* ***Email:*** *jiraporn.chm@mahidol.ac.th*
Received: *15 January 2015* ***Revised:*** *5 April 2015* ***Accepted:*** *6 May 2015*
Available online: *May 2015*

Abstract

Akai K, Chompikul J, and Rattanapan C
Rabies preventive behaviors of dog owners in Nakhon Pathom Province of Thailand
J Pub Health Dev.2015;13(1)17-28

A cross-sectional study was conducted to investigate rabies preventive behaviors of dog owners and related factors. Multi-stage cluster sampling was used to collect data at four health promoting hospitals of Nakhon Pathom province, Thailand. Structured questionnaires were distributed to 380 dog owners who were selected by the inclusion criteria. Data were collected through a structured questionnaire in March 2012. Chi-square tests and multiple logistic regression were used to examine associations between independent variables and rabies preventive behaviors.

A total of 319 self-administered questionnaires were completed and returned, resulting in a response rate of 83.9%. The results showed that 38.5 % of respondents had good preventive behaviors against rabies. Factors significantly associated with rabies preventive behavior were knowledge (p-value = 0.004), perception (p-value = 0.003), dog carers (p-value = 0.008), number of dogs (p-value = 0.024), experience of bitten by a dog (p-value = 0.039), heard about rabies (p-value = 0.006) and accessibility to rabies information (p-value < 0.05). When adjusted for other factors, perceptions towards rabies prevention was the strongest predictor of preventive behaviors (Adj. odds ratio = 1.99, 95% CI;1.11 – 3.59). Dog owners who had positive perception about rabies prevention were about two times more likely to have good preventive behaviors against rabies. The findings suggested that good knowledge and positive perceptions about rabies prevention should be promoted among dog owners and family members to prevent rabies.

Keywords: rabies, dog owners, preventive behaviors, Thailand

วารสารสาธารณสุขและการพัฒนา
ปีที่ 13 ฉบับที่ 1 มกราคม - เมษายน 2558

พฤติกรรมการป้องกันโรคพิษสุนัขบ้าของเจ้าของสุนัขในจังหวัดนครปฐม ประเทศไทย

เคโก๊ะ อาไก[1] จิราพร ชมพิกุล[2] และชีระวิทย์ รัตนพันธ์[2]

[1] *M.P.H.M. สถาบันพัฒนาสุขภาพอาเซียน มหาวิทยาลัยมหิดล ประเทศไทย*
[2] *Ph.D. สถาบันพัฒนาสุขภาพอาเซียน มหาวิทยาลัยมหิดล ประเทศไทย*

บทคัดย่อ

เคโก๊ะ อาไก จิราพร ชมพิกุล และชีระวิทย์ รัตนพันธ์
พฤติกรรมการป้องกันโรคพิษสุนัขบ้าของเจ้าของสุนัขในจังหวัดนครปฐม ประเทศไทย
ว.สาธารณสุขและการพัฒนา. 2558;13(1)17-28

การวิจัยครั้งนี้เป็นการศึกษาแบบภาคตัดขวางเพื่อสำรวจพฤติกรรมการป้องกันโรคพิษสุนัขบ้าของเจ้าของสุนัขและปัจจัยที่มีความสัมพันธ์กับพฤติกรรมนี้ ใช้วิธีการสุ่มตัวอย่างแบบชั้นภูมิหลายขั้นตอนในการเก็บรวบรวมข้อมูลที่โรงพยาบาลส่งเสริมสุขภาพตำบล 4 แห่งในจังหวัดนครปฐมโดยใช้แบบสอบถามมีเค้าโครง ผู้วิจัยได้แจกแบบสอบถามให้เจ้าของสุนัข 380 คนที่มีคุณสมบัติครบตามเกณฑ์คัดเลือกเข้าสู่การศึกษาในช่วงเดือนมีนาคม พ.ศ. 2555 วิเคราะห์ข้อมูลโดยใช้การทดสอบไคกำลังสองและการถดถอยลอจิสติคเพื่อศึกษาปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการป้องกันโรคพิษสุนัขบ้า

เจ้าของสุนัขได้ตอบแบบสอบถามอย่างครบถ้วนและส่งกลับคืนจำนวน 319 คน อัตราการตอบกลับเป็นร้อยละ 83.9 ผลการศึกษาพบว่า ร้อยละ 38.5 ของเจ้าของสุนัขมีพฤติกรรมการป้องกันโรคพิษสุนัขบ้าในระดับดี ปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการป้องกันโรคพิษสุนัขบ้า อย่างมีนัยสำคัญทางสถิติ ได้แก่ ความรู้เกี่ยวกับโรคพิษสุนัขบ้า (p-value = 0.004), การรับรู้เกี่ยวกับการป้องกันโรคพิษสุนัขบ้า (p-value = 0.003), ผู้ดูแลสุนัข (p-value = 0.008), จำนวนสุนัข (p-value = 0.024), ประสบการณ์การถูกสุนัขกัด (p-value = 0.039), การได้ยินเรื่องโรคพิษสุนัขบ้า (p-value = 0.006) และ การเข้าถึงข้อมูลเกี่ยวกับโรคพิษสุนัขบ้า (p-value < 0.05). เมื่อปรับอิทธิพลของตัวแปรอื่นๆแล้ว การรับรู้เกี่ยวกับการป้องกันโรคพิษสุนัขบ้าเป็นปัจจัยที่เป็นตัวพยากรณ์พฤติกรรมการป้องกันโรคพิษสุนัขบ้าได้มากที่สุด (Adj. odds ratio = 1.99, 95% CI;1.11 – 3.59) เจ้าของสุนัขที่มีรับรู้เชิงบวกเกี่ยวกับการป้องกันโรคพิษสุนัขบ้ามีแนวโน้มเกือบสองเท่าที่จะมีพฤติกรรมการป้องกันโรคพิษสุนัขบ้าในระดับดี จากผลการศึกษานี้ทำให้ได้ข้อเสนอแนะเพื่อการป้องกันโรคพิษสุนัขบ้าดังนี้ ควรส่งเสริมเจ้าของสุนัขและสมาชิกในครอบครัวให้มีความรู้เกี่ยวกับโรคพิษสุนัขบ้าในระดับดี และมีการรับรู้เชิงบวกเกี่ยวกับการป้องกันโรคพิษสุนัขบ้า

คำสำคัญ: โรคพิษสุนัขบ้า เจ้าของสุนัข พฤติกรรมการป้องกัน ประเทศไทย

Introduction

Rabies is an acute viral disease seen in mammals that adversely affects the central nervous system, leading to death. As per the report of World Health Organization (WHO), nearly 55,000 people die worldwide of the disease each year[1]. Almost death of rabies reported worldwide, nearly 80% occurred in the South East Asian region. The disease is typically transmitted through bites from infected animals. The majority of reported cases involved wild animals like bats, raccoons and skunks though domesticated animals such as dogs and cats. Humans are equally susceptible to the rabies virus if bitten by an infected animal.[2] Rabies is one of the longest-known infectious diseases in human history, for more than 4,300 years.[3] As yet, efficient therapy has not been established for obvious rabies. Once the symptoms have appeared, rabies is almost always fatal. Rabies has been successfully eradicated from Japan, UK, USA and elsewhere. People who are living in a developed environment are unaffected by this disease. However, in recent years, rabies has been becoming a major public-health problem in China.[4]

The available literature shows that mass vaccination of owned domestic dogs is crucial for the control of rabies. Rabies became a notifiable disease of Thailand in 1980, because of statistics have been officially recorded since 1929. Public health authorities in Thailand consider mass vaccination of dogs as the primary tool for the control of rabies.[5] When dog owners left their dogs outside their houses, the risk of getting rabies increases in terms of exposure risk and low antibodies production after dog's rabies vaccination.[6] Knowledge and preventive behavior of the households which own dogs are important for planning and implementation of rabies awareness and dog vaccination programs, and for the encouragement of responsible dog owners.[7]

In spite of the number of victims of rabies has been declined, rabies cases have not been eliminated. Thai people's recognition about dogs are different from other countries where are free of rabies. Therefore, this study was conducted in Nokhon Pathom province to inspect the rabies preventive behaviors of dog owners and to determine factor related to rabies preventive behaviors.

Methods

A cross-sectional study was conducted in communities in Nakhon Pathom province by using a structured questionnaire. The dog owners or representatives of households who raised dogs filled in the questionnaire. The target population is dog owners aged eighteen years old and older. Since rabies preventive behaviors of dog owners were similar in all districts of Thailand, multi-stage cluster sampling technique was used to draw a sample. Two districts were chosen from 7 districts in Nakhon Pathom province by a simple random sampling. Then, three sub-districts were chosen from the selected districts. Four villages were selected from the selected sub-districts. Dog owners were randomly selected from each village to obtain a sample. The data collection was conducted at four health promoting hospitals. The total number of dog owners were not available because there is no obligatory registration system. The sample size was calculated using a confidence interval of 9 5% with the acceptable error of 6%, thus

319 dog owners were required to participate in this study. People who were not able to read and write were not included in this survey.

The pre-test was conducted among 30 cases in one community in Lopburi province which was similar to communities in the study area in February, 2012. Kruder-Richardson (KR20) for the knowledge part was equal to 0.69. Cronbach Alpha coefficient for the perception part was equal to 0.73. After getting the permission from the Ethics Committee of Mahidol University (COA.No.2012/090.2003) the data collection was undertaken in March, 2012. A structured questionnaire was developed using the Health Belief Model[8] and was used as a tool in the study. It was constructed with closed-ended questions. The Thai questionnaire consisted of five parts; 1) Socio-demographic factors (14 items), 2) the knowledge about rabies prevention (14 items), 3) the rabies perception (13 items for the perceived susceptibility, perceived severity, perceived benefits and perceived barriers), 4)The accessibility to rabies information (cues to action) (five items), and 5)the rabies preventive behaviors (six items). The knowledge questions/statements consisted of cause, sign and prevention of rabies. In order to measure the dog owners' knowledge, a score was given 1 point for a correct answer and 0 point for incorrect one. The total score of knowledge was divided into three levels: good (score > 80%) , moderate (score from 60% to 80%) and poor (score < 60%). The perception questions/statements consisted of susceptibility, severity, benefits and barriers. The score ranged from 1 (strongly disagree) to 5 (strongly agree) for positive statements and reversed for negative statements. The total score of perception was divided into positive or negative group by using cut-off point at the score of the third quartile.

The rabies preventive behaviors consisted of six questions. A three-point rating scale ("Always", "Sometimes", and "Never") was used in the questionnaire. For positive statements, respondent's answer was "Always" received a score of three, for "sometimes" two, and "Never" received a score of one, and reversed for negative ones. The total score of preventive behaviors was categorized in two groups using the score at the third quartile as the cut-off point. If the total score was more than the score of the third quartile, it was classified in the good practice group (coded 1). Poor preventive behaviors was treated as the referent group. Data were analyzed using descriptive statistics. The Chi-square tests were used to determine associations between rabies preventive behaviors of dog owners and each independent variable. Multiple logistic regression was used to examine significant predictors for preventive behaviors.

Results

The 380 Thai questionnaires distributed to dog owners in four villages, then a total of 319 self - administered questionnaires were completed and returned, resulting in a response rate of 83.9%. Nearly 69% of respondents were female. Their age ranged from 18 years to 80 years with median age of 42 years and quartile deviation (QD) of 10 years. Nearly 30% finished primary school. The majority (98.4%) were Buddhists, while only 1.6% were Christians. Table 1 shows that 59.3% had moderate level of knowledge, 68% had negative perception, and 38.5 % had good preventive behaviors against rabies.

Table 2 shows percentage of respondents by each item/question of rabies preventive behaviors. 72.5% reported that the dog owners yearly took their dogs to receive vaccine, but 23.1 % sometimes did. Only 4.4% had never taken their dogs to receive vaccine. Only 32.5% of dog owners yearly took their dogs to receive medical checkup. Nearly 36.1% brought their dogs to a veterinary clinic when they were bitten by other dogs. Approximately, 66% did not sleep with their dogs in the same room.

Table 1 Percentage of respondents by socio-demographic factors, knowledge, perception, and rabies preventive behaviors

Factors	Number	Percent
Age group (years)	**292**	
≤ 20	11	3.8
21 -30	40	13.7
31- 40	73	25.0
41- 50	76	26.0
51- 60	55	18.8
≥61	37	12.7
Median = 42.0, QD = 10, Min = 18, Max = 8037 12.7		
Sex	**309**	
Female	212	68.6
Male	97	31.4
Religion	**310**	
Buddhism	305	98.4
Christianity	5	1.6
Education	**314**	
No Education	14	4.5
Primary	93	29.6
Secondary	49	15.6
High school	41	13.1
College	39	12.4
Bachelor	68	21.7
Other	10	3.1
Knowledge		
Poor	77	24.3
Moderate	188	59.3
Good	52	16.4
Perception		
Positive	102	32.0
Negative	217	68.0
Preventive behaviors		
Poor	195	61.5
Good	12	38.5

Table 2 Percentage of respondents by each item/question of rabies preventive behaviors

Rabies preventive behaviors	n	Always	Sometimes	Never
Do you yearly take your dog to receive vaccination at clinical government place?	316	72.5	23.1	4.4
Have you yearly taken your dog to receive medical checkup ?	311	32.5	46.0	21.5
Have you ever bring your dog to the veterinary clinic when bitten by other dogs?	310	36.1	26.5	37.4
Do you sleep with dog in the same room?	312	17.0	17.3	65.7
Do you keep your dog(s) outside the house?	306	29.4	20.6	50.0
Do you keep stray dogs off your house?	315	74.6	8.6	16.8
You do not play with stray dogs	313	55.3	16.9	27.8
Do you try to keep distance from stray dogs?	314	59.9	16.9	23.2

This study failed to detect any significant association between rabies preventive behaviors and age, sex, religion, education, marital status, occupation, family income, number of family members, number of children, and purposes of raising dogs. Table 3 presents factors significantly associated with preventive behaviors were dog carers (p-value = 0.008), number of dogs (p-value = 0.024), experience of bitten by a dog (p-value = 0.039), heard about rabies (p-value = 0.006), knowledge levels (p-value = 0.004) about rabies and perception (p-value = 0.003) with rabies preventive behaviors.

Table 3 Association between study factors and preventive behaviors

Factors	Preventive behaviors				Chi-Square test (df)	p-value
	Good		Poor			
	n	%	n	%		
Dog carers					6.928	0.008**
Owner	53	31.9	113	68.1	(1)	
Family / friends	67	46.5	77	53.5		
Number of dogs					9.472	0.024*
1	59	37.8	97	62.2	(3)	
2	34	54.0	29	46.0		
3	12	28.6	30	71.4		
≥ 4	17	30.9	38	69.1		
Experience of bitten by a dog					4.248	0.039*
Yes	37	31.6	80	68.4	(1)	
No	85	43.4	111	56.6		
Knowledge						**0.004[F]****
Good	0	0	52	100		
Moderate to Poor	122	46	143	54.0		
Perception					8.649	**0.003****
Positive	95	44.0	121	56.0	(1)	
Negative	27	26.7	74	73.3		

*p-value < 0.05 **p-value < 0.01

[F]Fisher's exact test

Table 4 displays significant association between "having heard about rabies from village health volunteers (VHV)" and preventive behaviors was detected (p-value=0.025). With regard to the type of information (mode of transmission) (p-value=0.003) had a significant association with preventive behaviors. Watching news about rabies via television also significantly associated with preventive behaviors (p-value = 0.007).

Table 4 Association between the accessibility to rabies information and preventive behaviors

Accessibility to rabies information	Preventive behaviors				Chi-Square test (df)	p-value
	Good		Poor			
	n	%	n	%		
Heard about rabies					**7.469**	**0.006****
Yes	106	36.2	185	63.8	**(1)**	
No	17	63.0	10	37.0		
Heard about rabies from VHVs					**5.056**	**0.025***
Yes	57	31.3	125	68.7	**(1)**	
No	49	44.4	60	55.6		
Heard about rabies from television					7.252	**0.007****
Yes	79	32.8	162	67.2	(1)	
No	26	53.1	23	46.9		
Type of rabies information (Mode of transmission)					8.871	**0.003****
Yes	28	25.5	82	74.5	(1)	
No	77	42.8	103	57.2		

*p-value < 0.05 **p-value < 0.01

For further analysis to resolve which independent variables had a significant association after adjusting the effects of other factors, multiple logistic regression was applied. The all significant independent variables from the chi-square tests were included in the multiple logistic regression, the following factors were found to be significant predictors of preventive behaviors: dog carers, having rabies information about mode of transmission and perception (Table 5). Dog owners who had positive perception about rabies prevention were about twice more likely to have good preventive behaviors.

Table 5 Adjusted odds ratios for rabies preventive behaviors

Independent variables	Adjusted OR	95% CI		p-value
		Lower	Upper	
Dog carers				
Owner	1			
Others	1.92	1.14	3.21	0.013
Number of dogs				
1	1			
> 2	1.29	0.76	2.19	0.345
Experience of bitten by a dog				
Yes	1			
No	0.75	0.43	1.29	0.291
Heard about rabies from VHVs				
Yes	1.45	0.85	2.49	0.175
No	1			
Type of rabies information (Mode of transmission)				
Yes	1			
No	0.45	0.26	0.79	0.006
Heard about rabies from a television				
Yes	1			
No	0.51	0.25	1.02	0.056
Perception levels				
Positive	1.99	1.11	3.59	0.022
Negative	1			

Discussion

This study found that there was higher proportion of respondents (61.5%) in poor preventive behaviors group than those in good preventive behaviors (38.5%). Nearly 73% replied that the dog owners had yearly taken their dog to receive vaccine, but 23.1 % had taken their dog to receive vaccine sometimes. Only 4.4% of dog owners had never taken. This result was better than the previous study of Matibag G.C. et al[9] or the survey in Thungsong district[10] though, lower than another study where it was conducted in Bangkok[11], a percentage of vaccine coverage of house dogs was 91%.

In this study, 68.6% of respondents were female, 98.4% were Buddhist, and 58.7% were married. This study failed to find any association between rabies preventive behaviors and age, sex, religion, education, marital status, occupation, family income, number of family members, and number of children. Intriguingly, the distribution of those, there was no observable difference.[12] However, there was a case; level of dog care was found to be influenced by age, sex[13] and marital status[14] in the previous study.

In this study, more than half (53.9%) of the respondents were carers of own dog(s), and another family member (54.5%) had taken care while friends were only 0.6%. One dog in one household accounted for a large percentage (49.2%) within the limits of number of dog, also their main purpose for raising dog were watchdog (51.0%) as a guard. When asked about experience of bitten by dog, 62.8% of the respondents had not experienced. In order to examine the incidence of dog bites decreased with increasing age[15,] it should have asked about family members' experience. Nearly all (91%) of the respondents had heard about rabies. Especially, regarding to the knowledge score about symptoms of rabies was very low. It might be thought that almost respondents never learn about rabies[16]. This result was similar to the study of Thailand[17] in 2008. The result showed 68% of the respondents had negative perception though; it could be considered that most of respondents had a philosophy called negativism during heard about rabies information. The respondents who had low level of knowledge were anxious with apprehension[18].

Approximately 26.7% of the respondents strongly disagreed with the dog population control by female sterilization and male castration, also 32.4% of the respondents disagreed. For the information, male owners disagreed with castration male pets while female owners were more likely to agree with castration male pets in Romania[19]. Both of sterilization and castration for pets are dominating and pervasive methods[20-21] for controlling of animal population, especially cats and dogs in developed countries. The most of the respondents had obtained the information of rabies prevention (71.6%) from the village health volunteer (63%). In addition, the television (82.9%) was the largest media which notify the respondents of the risk about rabies. In view of cases where personal information was obtained, the village health volunteers were far ahead of the other people. Rabies is well known disease; however it is not common disease for people. Therefore, the village health volunteers who explained treatment and prevention of particular disease based on their experience made sufficient contributions. Concerning the psychosocial factors in this study, good level of knowledge and positive perception regarding rabies were related to preventive behaviors.[22] However, the association between

knowledge and rabies preventive behavior could not be detected in this study. Thailand has the third highest number of rabies in Asia although more recent data showed improving of the situation.[23]

Recommendations

Positive perception about rabies prevention should be promoted to create opportunity for not only dog owners but also other residents to aware of the risk of rabies. Good knowledge about rabies and positive preventive behaviors to raise dog(s) should be promoted in dog owners and their family members. All dogs should get rabies vaccination and a medical check-up once a year. Moreover, dog owners should bring their dogs to a veterinary hospital when it bitten by another dog. Best practices from free-rabies countries should be learnt and applied to prevent rabies such as requiring a dog license from a dog owner.

Dog owners should consider about necessity of rabies prevention. Sufficient information[24] should be provided to people about rabies at stated period of raising dogs. On the occurrence of rabies incidence, especially in domestic cases, prescribed extra flyers should be issued and distributed to dog owners.

Acknowledgements

I express my deep sincere gratitude to all research coordinators in all health promoting hospitals who gave me great support during data collection. I also greatly appreciate all dog owners who participated in this study.

References

1. World Health Organization. WHO guide for rabies pre and prophylaxis in humans. 2010 [Online] Available from: http://www.who. int/rabies/PEP_prophylaxis_guidelines [Accessed 2012 Jan 1]
2. Koprowski H. After Pasteur: History of New Rabies Vaccines. In: Plotkin SA, editor.History of Vaccine Development. :New York; Springer; 2011.
3. Takayama N. Rabies: a preventable but incurable disease. J Infect Cemother. 2008; 14(1):8-14
4. Song M, Tang Q, Ming D, Mo ZZ, Guo SH, Li H, et al, Epidemiological investigations of human rabies in China, BMC Infect Dis. 2009; (9):210 doi:10.1186/1471-2334-9-210
5. Ministry of Public Health-Huma Trafficking.org: [Online] Available from www.human trafficking. org/ens.moph.go.th.[Accessed 2011 Dec 31].
6. Mangara S G. Study of dog owner behavior and opinions with its influential factors towards rabies control programme in the slum area of Bangkok, Thailand. [M.P.H. Thesis in Urban Health]. Bangkok: Faculty of Graduate Studies, Mahidol University. 1991.
7. Knobel D, Laurenson K, Kazwala R, Boden L, Cleaveland S. A cross-sectional study of factors associated with dog ownership in Tanzania. BMC Vet Res. 2008; 4(1):1-10.
8. Rosenstock I M, Strecher V J, Becker M H, Social learning theory and the Health Belief Model. Health Educ Qquart. 1988; (15): 175-183.

9. Matibag G C, Kamigaki T, Kumarasiri P V R et al., Knowledge, attitudes, and practices survey of rabies in a community in Sri Lanka, JEHPM, 2007; (12): 84-89.
10. Kongkaew W, Coleman P, Pfeiffer D, et al., Vaccination coverage and epidemiological parameters of the owned-dog population in Thungsong District, Thailand, Prev Vet Med. 2004; 65(1-2): 105-115.
11. Lumlertdacha B, Wacharapluesadee S, Denduangboripant J, et al,. Complex genetic structure of the rabies virus in Bangkok and its surrounding provinces, Thailand: Implications for canine rabies control. Trans R Soc Trop Med Hyg. 2006; (100): 276-281.
12. Helms T, Bain M, Evaluation of owner attachment to dogs on the basis of whether owners are legally considered guardians of their pets, J Am Vet Med Assoc. 2009; (234): 896-900.
13. Tenzin, Navneet K, Gyeltshen T, Dog bites in humans and estimating human rabies mortality in rabies endemic areas of Bhutan, PLoS Negl Trop Dis. 2011; (234): 11. doi:10. 1371
14. Marinelli L, Adamelli S, Normando S, et al, Quality of life of the pet dog: Influence of owner and dog's characteristics, Appl Anim Behav Sci. 2008;(108): 143-156.
15. Schalamon J, Ainoedhofer H, Singer G, et al,. Analysis of dog bites in children who are younger than 17 years, J Pediatr. 2006; (117): 374-379.
16. Bourhy H, Dautry-Varsat A, Hotez P, et al., Rabies, Still Neglected after 125 Years of Vaccination, PLoS Negl Trop Dis. 2010; 4(11): 839 [Online] Available from http://www.plosntds.org/article/info. [Accessed 2014 Dec 01].
17. Kasempimolpom S, Jitapunkul S, Sitprija V, Moving towards the elimination of rabies in Thailanad, J Med Assoc Thai. 2008; 91(3): 433-7.
18. McCroskey J C. Human Communication Research. Inter Communication Assoc. 1977; 4(1): 83-96.
19. Cocia R, Rusu A, Attitudes of Romanian pet caretakers towards sterilization of their animals: Gender conflict over male, but not female, companion animals, ANTHROZOOS Journal. 2010; (29): 185-191.
20. Adedeji1 A O, Okonko I O, Eyarefe O D, et al., An overview of rabies-History, epidemiology, control and possible elimination, AJMR. 2010; 4(22): 2327-2338.
21. Tami G, Gallagher A, Description of the behaviour of domestic dog (Canis familiaris) by experienced and inexperienced people, Appl Anim Behav Sci. 2009; (120): 159 -169.
22. Tenzin, Navneet K, Rai B, et al., Community-based study on knowledge, attitudes and perception of rabies in Gelephu, south-central Bhutan. Int Health. 2012; (4): 210-219.
23. Ministry of Public Health, Thailand. WHO Country Office for Thailand [Online] Available from http://www.searo.who.int/thailand/news/wrd2013/en/ [Accessed 2014 Dec 31]
24. Dodet B. The fight against rabies in Africa: From recognition to action. Vaccine. 2009; 27(37):5027-32.