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Original Article

Knowledge, Attitudes, and Practices Survey of Rabies in a Community in Sri Lanka

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Abstract

Objectives: The primary objective of this study was to determine the level of knowledge, attitudes and practices (KAP) of rabies management and control of a sample population. The secondary objective was to compare the KAP with respect to rabies management and control between urban and rural areas and between pet and non-pet owners.

Methods: This cross-sectional study was carried out by conducting face-to-face interviews using structured questionnaires among 1570 respondents from selected households in the Kandy District, Sri Lanka.

Results: Approximately 58% of the sample population was pet owners. Among all the respondents, there was a high level of awareness (90%) that dogs are the most common rabies reservoir, that the disease is fatal (79%), and that rabies can be prevented by vaccination (88%). Most of the subjects (96%) would seek treatment from a doctor or a hospital after being bitten by a dog. Although 76% of the respondents said that their pet dogs were vaccinated, only one-half were able to present a vaccination certificate upon request. The subjects from the urban areas would submit the head of an animal for rabies evaluation (69%) compared with those from the rural areas (57%). Pet owners (93%) are more aware that dog rabies vaccines are available from authorized offices than non-pet owners (87%).

Conclusions: The level of awareness of rabies and the level of receptiveness to rabies control measures are high. There is a difference in the attitudes and pet care practices relevant to rabies control between urban and rural areas. Pet owners tend to be more cooperative to rabies control activities. The attitudes and practices of the respondents may reflect the inaccessibility of facilities and the lack of services that would enable community participation in rabies control.

Key words: knowledge, attitude, practice, rabies, Sri Lanka

Introduction

A national program for the control and eradication of human and animal rabies in Sri Lanka has been adopted since the mid-1970s (1, 2). The program made provisions for the immunization of dogs to achieve 75–80% vaccination coverage, elimination of stray dogs, post exposure prophylaxis (PEP) for suspected animal-bite victims, and other related issues including the periodic evaluation of the rabies control program (1).

However, rabies remains endemic throughout the island and more than 96% of the reported animal rabies cases were mainly from dogs that caused 95% of human rabies cases (3–5). The numbers of human rabies cases that were reported in the country from 2003 to 2005 were 76, 98 and 55, respectively (6, 7). Endemic canine rabies, a high dog population density, large numbers of unvaccinated and poorly cared dogs, and a low percentage of people seeking medical advice after being bitten by animals are the main factors that contribute to the increase in

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the number of cases of human rabies (8).

The primary objective of this study was to determine the level of knowledge, attitudes and practices (KAP) with respect to rabies of a sample population. The secondary objective was to compare the KAP with respect to rabies management and control between urban and rural areas and between pet and non-pet owners. These data would be useful for designing a rabies prevention and control program in the future targeting both the animal source and the human population at risk.

Materials and Methods

Study design

This cross-sectional study was carried out in May 2006 in selected local villages [Grama Niladari (GN) Divisions] of the Kandy District. Hokkaido University's partnership with the University of Peradeniya expedited the completion of this study.

Study area and sample population

The study area was located in the Kandy District (2001 population: 1.27 million) which is 116 kilometers away from Colombo (9, 10).

We classified the study areas into urban and rural areas. The respondents were household members 15 years old and above. Due to budgetary and logistical limitations, we surveyed about 1570 respondents. The households were chosen on the basis of the security condition of the location and their proximity to the University of Peradeniya. After selecting the first household, the next nearest household was visited thereafter until the target number of respondents was interviewed. One person from each household was interviewed.

Procedures

We carried out face-to-face interviews using structured and pretested questionnaires. The questionnaires included items regarding their level of KAP with respect to rabies management and control, household information, and pet care. A rural area was defined as including both rural and estate sectors. Animal vaccination was defined as having been immunized (oral or parenteral) one year before the survey.

Prior to the pretesting and survey, the questionnaires were translated into local languages (Sinhalese and Tamil) and then back-translated to English to ensure validity.

Data collection and statistical analysis

The following general characteristics of a target population were included in the survey: gender, age, educational attainment, religion, ethnicity, socioeconomic sector (urban and rural) and pet ownership. The Chi-square test or Fisher's exact test (2-tailed) was used, as appropriate, to evaluate the statistical significance of the differences in responses between the subjects from the urban and rural areas or between pet and non-pet owners. A p value <0.05 was considered statistically significant. To adjust for the confounding effects of other variables on the responses of pet and non-pet owners, logistic regression analysis was applied. Data were analyzed using SPSS version 14.0.

Results

There were 1570 households included in the survey. Table 1 shows the profile of household respondents from the urban and rural areas.

Twelve percent of the respondents were from the urban area and 88% from the rural area. The median age of the respondents was 46 years. Approximately 89% of the sample population attended school. The majority of the sample population (86.5%) was Buddhists whereas Sinhalese comprised 87.7%. More than 58% of the subjects owned pets. The average household size was 4.54 with a monthly income of 8428 rupees (approximately US$84).

Knowledge of rabies (Table 2)

The majority of the sample population (89.6%) was aware that dogs are the main reservoir of rabies, that rabies is fatal, that rabies could be prevented by vaccination, and that rabies vaccine could be obtained from government-authorized institutions. There were significantly more people from the rural areas who were aware that rabies is a fatal disease.

Most respondents obtained information on rabies from several sources. People from the rural areas obtained information on rabies mostly from government vaccination campaigns.

Attitudes toward health and health practices (Table 3)

More than 85% of the respondents were willing to register their pets. However, respondents from the urban areas were less likely to inform the authorities (veterinarians or police) if they were bitten by dogs. About 71% of the people would have their pets euthanized if their pets showed symptoms similar to rabies.

Forty three percent of the people were aware that the head of a suspected rabid animal should be cut and submitted to a diagnostic laboratory for rabies diagnosis and confirmation. There were significantly more respondents from the urban areas who had knowledge of this procedure.

After being informed about the proper procedure for specimen submission, 58% of the respondents said that they would submit the heads of suspected animals to the laboratory; however, people from the rural areas were less likely inclined to do so.

Eighty-six percent of the respondents were in favor of implementing the animal birth control (ABC) program, and would want authorities to euthanize stray dogs. Approximately one-half of the respondents were annoyed with stray dogs. There were significantly more urban respondents who were annoyed and who would want authorities to euthanize stray dogs.

The majority of the respondents preferred the ABC program (63.6%) to the euthanasia of rabid animals (22.7%) for controlling rabies but there was a significant difference in the number of people preferring different rabies treatments between the urban and rural areas.

The majority of the respondents (95.5%) would prefer to consult physicians rather than go to traditional healers after being bitten by an animal. The respondents from the rural areas were more likely to seek treatment from traditional healers than those from the urban areas.

Table 1 Profile of household respondents from urban and rural areas

	Total		Urban		Rural	
	n	%	n	%	n	%
Gender						
Male	645	41.7	100	52.6	545	40.2
Female	902	58.3	90	47.4	812	59.8
Age (years)						
15–29	218	13.9	21	10.9	197	14.3
30–39	318	20.3	33	17.2	285	20.8
40–49	402	25.7	51	26.6	351	25.6
50–59	336	21.5	38	19.8	298	21.7
≥60	291	18.6	49	25.5	242	17.6
Education						
Preschool/No formal education	168	10.8	11	5.8	157	11.5
Primary	638	41.1	67	35.3	571	41.9
Secondary	676	43.6	86	45.3	590	43.3
Tertiary	70	4.5	26	13.7	44	3.2
Religion						
Buddhism	1337	86.5	149	78.4	1188	87.6
Hinduism	106	6.9	19	10.0	87	6.4
Islam	56	3.6	6	3.2	50	3.7
Christianity	47	3.0	16	8.4	31	2.3
Ethnicity						
Sinhalese	1365	87.7	161	84.7	1204	88.1
Tamil	134	8.6	21	11.1	113	8.3
Moor/Burgher/Malay	57	3.7	8	4.2	49	3.6
Pet ownership						
With pets	912	58.1	91	47.4	748	58.4
Without pets	658	41.9	101	52.6	532	41.6
Household size	4.54±0.08		4.39±0.23		4.55±0.08	
Monthly income, Rupees	8428.80±1145.79		9284.21±4117.96		8275.47±1168.29	

Table 2 Knowledge of rabies in urban and rural areas

	Total		Urban		Rural		p value
	n	%	n	%	n	%	
Main reservoir of rabies in Sri Lanka							
Dog	1400	89.6	178	92.7	1222	89.1	0.097
Cat	40	2.6	7	3.6	33	2.4	
Cattle/Rat/Bat	45	2.9	2	1.0	43	3.1	
Uncertain	78	5.0	5	2.6	73	5.3	
Knows about the fatal nature of rabies							
Yes	1220	78.7	137	71.7	1083	79.6	0.002
No	219	14.1	43	22.5	176	12.9	
Uncertain	112	7.2	11	5.8	101	7.4	
Knows that rabies could be prevented by vaccination							
Yes	1364	88.1	166	87.8	1198	88.2	0.195
No	96	6.2	8	4.2	88	6.5	
Do not know	88	5.7	15	7.9	73	5.4	
Knows that dog rabies vaccine could be obtained from authorized government offices							
Yes	1376	90.6	170	90.9	1206	90.5	1.000
No	143	9.4	17	9.1	126	9.5	
Sources of information							
Multiple sources	934	60.7	137	72.1	797	59.1	0.000
Government rabies vaccination campaigns	237	15.4	10	5.3	227	16.8	
Newspaper/TV/Radio	173	11.2	24	12.6	149	11.0	
Others	195	12.7	19	10.0	176	13.0	

Table 3 Health attitudes and practices in urban and rural areas

	Total		Urban		Rural		p value
	n	%	n	%	n	%	
Willing to register pets							
Yes	1163	85.3	140	85.4	1023	85.3	0.980
No	80	5.9	10	6.1	70	5.8	
Undecided	121	8.9	14	8.5	107	8.9	
Would inform authorities if bitten by dog							
Yes	859	55.6	85	45.0	774	57.0	0.002
No	687	44.4	104	55.0	583	43.0	
Would euthanize pet if rabid							
Yes	1013	71.1	129	76.8	884	70.4	0.102
No	411	28.9	39	23.2	372	29.6	
Knows that the head of suspected animal must be submitted to MRI for confirmation*							
Yes	641	43.0	110	60.1	531	40.6	0.000
No	849	57.0	73	39.9	776	59.4	
Would send the head of the suspected animal to MRI*							
Yes	825	58.0	113	68.9	712	56.6	0.002
No	598	42.0	51	31.1	547	43.4	
In favor of the animal birth control (ABC) program							
Yes	1324	85.5	163	86.2	1161	85.4	0.710
No	153	9.9	16	8.5	137	10.1	
Undecided	71	4.6	10	5.3	61	4.5	
Annoyed with stray dogs							
Yes	724	51.0	103	58.2	621	50.0	0.003
No	582	41.0	53	29.9	529	42.6	
Sometimes	113	8.0	21	11.9	92	7.4	
Would want authorities to euthanize stray dogs							
Yes	1289	85.5	165	90.7	1124	84.8	0.042
No	218	14.5	17	9.3	201	15.2	
Actions preferred							
Animal birth control	893	63.6	97	54.5	796	65.0	0.001
Animal disposal	318	22.7	50	28.1	268	21.9	
Combined population control and disposal	72	5.1	18	10.1	54	4.4	
Others	120	8.6	13	7.3	107	8.7	
Would seek treatment first if bitten by dogs							
Doctor/hospital	1490	95.5	191	99.5	1299	94.9	0.017
Native/traditional healers	59	3.8	1	0.5	58	4.2	
None/Uncertain	12	0.8	0	0.0	12	0.9	

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Table 4 Pet care practices in urban and rural areas

	Total		Urban		Rural		p value
	n	%	n	%	n	%	
Pet dogs are							
housed in cages	322	38.1	47	43.5	275	37.3	0.023
free to roam around	281	33.3	24	22.2	257	34.9	
tied outside the house	160	18.9	20	18.5	140	19.0	
living inside the house	72	8.5	16	14.8	56	7.6	
housed in cages and is free to roam sometimes	10	1.2	1	0.9	9	1.2	
Pet dog/cat has been vaccinated for rabies one year prior to survey							
Yes	750	76.1	108	88.5	642	74.3	0.002
No	229	23.2	13	10.7	216	25.0	
Uncertain	7	0.7	1	0.8	6	0.7	
Able to show the dog vaccination certificate							
Yes	355	48.1	63	58.9	292	46.3	0.016
No	383	51.9	44	41.1	339	53.7	

Table 5 Odds ratio (OR) and adjusted odds ratio (OR*) for KAP of rabies management and control according to pet ownership

	Total		With pets		Without pets		OR	95% CI	p value	OR*	95% CI	p value
	n	%	n	%	n	%						
Knowledge												
Knows that dog rabies vaccine could be obtained from authorized government offices												
Yes	1376	90.6	827	92.9	549	87.3	1.91	1.35–2.71	0.000	1.97	1.38–2.81	0.000
No	143	9.4	63	7.1	80	12.7						
Attitude												
Willing to register pets												
Yes	1163	85.3	761	87.1	402	82.0	1.57	1.14–2.15	0.005	1.47	1.09–2.00	0.012
No/Undecided	201	14.7	113	12.9	88	18.0						
Would destroy pet if rabid												
Yes	1013	71.1	643	73.2	370	67.8	1.34	1.05–1.72	0.020	1.30	1.03–1.64	0.027
No	411	28.9	235	26.8	176	32.2						
In favor of the animal birth control (ABC) program												
Yes	1324	85.5	785	87.5	539	82.8	1.43	1.06–1.93	0.018	1.46	1.10–1.93	0.009
No/Undecided	224	14.5	112	12.5	112	17.2						
Annoyed with stray dogs												
Yes	724	51.0	371	45.9	353	57.9	0.64	0.51–0.80	0.000	0.62	0.50–0.76	0.000
No/Sometimes	695	49.0	438	54.1	257	42.1						
Practice												
Would seek treatment first if bitten by dogs												
Doctor/hospital	1490	95.3	860	94.7	630	96.2	0.71	0.43–1.16	0.176	0.82	0.48–1.38	0.446
Native/traditional healers/None/Uncertain	73	4.7	48	5.3	25	3.8						

* Adjusted odds ratios for urban or rural areas, gender, age, education, religion, ethnicity and pet ownership

Pet care practices (Table 4)

Pet dogs were mostly housed in cages whereas some dogs were allowed to roam freely, chained outside the owner's houses, or cohabit with the owners. There were significantly more rural respondents who allowed their dogs to roam freely.

About 76% of the respondents said that their pets have been vaccinated against rabies. When asked, only 48.1% of them were able to show their pet's vaccination certificate. The percentage of urban respondents who were able to show their pets' vaccination certificates was significantly higher than that of the rural respondents.

Rabies KAP according to pet ownership (Table 5)

The percentages of pet owners who knew that dog rabies vaccine could be obtained from authorized government offices (OR=1.91), who favor to euthanize rabid pets (OR=1.34), and who favor the ABC program (OR=1.43) were higher than those of non-pet owners. Pet owners were more willing to register their pets (OR=1.57) and were less annoyed with stray dogs than non-pet owners (OR=0.64). Both pet and non-pet owners would seek medical treatment following an animal bite (OR=0.71).

Discussion

We investigated the level of KAP with respect to rabies management and treatment as well as pet care practices in the Kandy District, Central Province, Sri Lanka. The limitation of our study is the nonrandom selection of respondents due to the topography of the study areas and the distribution of houses, unfavorable weather conditions and security concerns. Our sample population, however, had similar demographic characteristics to those of the general population of Sri Lanka. The following parameters used in the study were similar to those of the national data: population distribution based on socioeconomic sector, male: female ratio, literacy rate, and proportions of ethnic groups. The household sizes were between those reported for the Kandy District (4.3) and Sri Lanka (4.9). Our sample population belonged to the lower income cohort compared with those from national and Central Province whose average monthly incomes were 12,804 and 11,174 rupees, respectively (9).

Our study showed that there is a high level of awareness regarding the source of rabies, its fatal nature, and its prevention by vaccination, and where to obtain rabies vaccine. This high level of awareness may be due to the availability of information from multiple sources including government campaigns and mass media in addition to the free medical services available in government hospitals. This may explain why the majority of the respondents would seek medical care from a hospital or a doctor after being bitten by dogs in contrast to India's surveyed population where 42% preferred household treatment such as chili application (11). About 400,000 vials of tissue culture vaccines are used annually and the cost of PEP would amount to approximately US$5 million.

The majority of the respondents said that they are willing to register their pets and are in favor of rabies control programs such as the ABC program and the euthanasia of stray dogs. However, their willingness is not a guarantee that they will cooperate in government rabies control programs. When asked if they would inform authorities if they were bitten by a dog, only one-half of the respondents answered affirmatively and

even less from the urban areas. Even after knowing that the head of a suspected rabid animal should be submitted for rabies diagnosis and confirmation, there is only a slight increase in the number of respondents who are willing to do so. Furthermore, less than 50% of the respondents were able to prove that their dogs have been vaccinated against rabies. This discrepancy between attitude and practice towards rabies management and control should be further studied. A possible factor is accessibility to diagnostic facilities or centers for animal head submission and animal vaccination. Local authorities should facilitate the immediate transport of specimens to a central diagnostic laboratory. The decentralization or establishment of satellite diagnostic laboratories is another strategy. Mass dog rabies vaccination should be implemented regularly (12). For inaccessible animals, the use of oral rabies vaccine may be useful as shown by studies carried out in Slovenia, Sri Lanka, and the United States (13–15).

There is much to be improved regarding the pet care practices of the people in the sampled areas. Less than one-half of the total numbers of dogs are kept in cages or in the house particularly in the rural areas. The practice of allowing dogs to roam freely would facilitate the spread of rabies in the animal population and would make rabies a continuing zoonotic threat to humans.

The negative behaviors and practices regarding rabies management and control may reflect the inaccessibility of diagnostic facilities and services that may enable the people to participate in rabies control programs at the personal, household and community levels. The lack of diagnostic facilities and services is more pronounced in the rural areas, explaining why people in the rural areas are less likely to submit the head of a suspected rabid animal for evaluation, fewer dogs are vaccinated against rabies, and more dogs are allowed to roam freely in the rural than in the urban areas. Rural areas should therefore be given priority for the implementation of rabies control programs. Moreover, special attention should be given to non-pet owners because they are less aware of the disease and may have the false sense of security that being bitten by an animal is a remote possibility for them.

Other possible reasons for the disparities between the level of KAP regarding rabies management and control should be explored for more comprehensive analysis. In the meantime, proven effective rabies control measures such as mass dog rabies vaccination should be effectively implemented and regularly sustained particularly in the rural areas where more dogs are allowed to roam freely, making rabies a continuous zoonotic threat to other animals and the human population.

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