



A Community Based Survey on Rabies Control and Prevention using KAP in Jammu, India

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ABSTRACT

As per revised estimate nearly 20,583 people die of rabies every year in India, contributing to one third of the global rabies burden. Community based surveys with respect to Knowledge, Attitude and Practices (KAP) are important both for human deaths due to rabies and for the effective control of disease in animals. The present cross-sectional survey was carried to investigate level of community knowledge as well as attitudes and perception about rabies in and around Jammu, North India. A total of 200 respondents in the age group of 18 to 29 (55%) years were interviewed using pre-tested and structured questionnaires. Location wise origin of the respondents was 130 (65%) from urban and 70 (35%) from rural areas and sex-wise 157 (76%) males and 48 (24%) were females. Dog owners and being urban respondents had good knowledge level and attitude towards rabies compared to non-dog owners and rural dwellers. Surveyed population with 77.8 and 77 percent had heard of rabies and believed it to be fatal respectively. Urban respondents (98.9 %) believed rabies to be fatal and was transmitted by dogs or other species, 94 percent believed that owned dog must receive rabies vaccine, 89 to 94 percent believed reporting to hospitals or higher authorities regarding dog bite and outbreak of rabies in a community whereas 78 percent believed in killing stray dog if rabies was suspected. Good practices prevailed in respondents that owned dogs. The knowledge, attitude and practices with respect to prevention and treatment of rabies were not found adequate amongst the rural population. Thus, community based health education becomes essential in these areas to create awareness regarding rabies.

Keywords: KAP, Canine rabies, Cross-sectional survey, Jammu

Rabies is one of the oldest identified diseases affecting human population and one of the important zoonotic diseases in India. Since 1985, in India annually around 20,000 – 30,000 human rabies deaths were estimated. Most of the rabies deaths are amongst people from poor or low income socio-economic status (Rozario, 2008). WHO, the World Organization for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO) and the Global Alliance for Rabies Control have set a global target of “zero human rabies deaths by 2030” (WHO, 2017). World Rabies Day was officially launched in 2007 which aims to raise public awareness regarding the health impacts of human and animal rabies (www.avma.org).

KAP as cross sectional study help in assessing the status of dog owners pertaining to their knowledge about rabies. In countries where the virus circulates in the dog population, more than 99 percent of all human rabies cases are the result of exposure to rabid dogs (Wandeler *et al.*, 1993). A person bitten by a rabid dog, if left untreated with post-exposure prophylaxis (PEP), has about a 5 percent (if bitten on hand) to 70 percent (if bitten on face) probability of developing clinical rabies (Cleaveland *et al.*, 2002). The awareness about mode of rabies transmission, associated rabies risk, vis-a-vis adequate preventive measures needs to be assessed (Altmann *et al.*, 2008). Appropriate efforts to educate the public about the epidemiological features of rabies and simple “Dos and Don’ts” that can protect



them as well as help in bringing about a reduction in the incidence of rabies are not up to the mark (WHO, 2004).

The reliable data on rabies, its perception and associated practices are scarce in many parts of the world, making it difficult to assess its real impact on human and animal health (WHO, 2005). Many such practices that may increase exposure of people to the disease must be recognized. A study on rabies knowledge, attitude and practice (KAP) in Kandy District, Central Province, showed that there was high level of awareness and receptiveness to rabies control measures among the people (Matibag *et al.*, 2007). The practices that still need to be improved reportedly include: reporting of dog bites; knowledge and enthusiasm to take suspected animals to a diagnostic laboratory for disease confirmation; seeking medical treatment after a dog bite; pet restriction and vaccination etc. In India, very few community- based epidemiological studies on knowledge, attitude and practice about rabies prevention and control are on record (Prakash *et al.*, 2012).

The questionnaire based information on demographic characteristics of the dog owners, their association with dogs, knowledge, attitude and practice towards rabies were evaluated in the present study by understanding the knowledge, attitude and perception of rabies and various control measures in vogue in the study area. The survey was conducted between September, 2016 and December, 2016. Associations between demographic variables and KAP scores were assessed by using appropriate statistical tests (Veronica *et al.*, 2014).

MATERIALS AND METHODS

Study area

The survey was conducted in Jammu district, area located in South-Western part of the state of Jammu and Kashmir.

Sample size

A total of 200 respondents were interviewed with 130 participants (65%) from urban areas and 70 participants (35%) from rural areas. The participation was voluntary and collected data was kept confidential. The interview was conducted to assess the knowledge, attitude and perceptions of rabies.

Questionnaire design

A questionnaire designed for this study was partly adapted from similar such studies conducted elsewhere (Matibag *et al.*, 2007; Matibag *et al.*, 2009; Bingham *et al.*, 2010). It consisted of few closed and a few open ended questions. The questionnaire designed comprised of 4 compartments: items regarding the respondent and socio-demographic information (age, sex, education level, occupation, religion, ethnicity, number of people in the household, dog ownership status, location); questions related to the knowledge and perception of rabies; questions related to attitudes and perception of rabies and its control activities; and questions on pet care practices (asked from dog owners only). The questionnaire was prior tested before the conduct of actual survey in order to improve clarity and interpretation.

Sampling procedure

Individual face to face interviews of the visitors to various clinics including both governmental and non-governmental clinical complexes was conducted. The volunteers questioned in the study were in the age group of 18 to 65 years old. The interviewed persons were pre-informed about the purpose of the study and the answers were recorded in English on the pre-devised proforma.

Data management and analysis

Data were entered, managed and analysis were carried out using SPSS software v.16 (SPSS Inc. Chicago, Illinois, USA and Microsoft Excel (Microsoft Corp., Redmond, Washington, USA).

Descriptive statistics

Descriptive statistics were calculated for each variable under study. Bivariate analysis were performed using χ^2 test to compare the responses to the questions related to the knowledge, attitude and perception of rabies between respondents from urban and rural areas as well as dog owners and non-dog owners. A p-value <0.05 was considered statistically significant. Regarding Socio-demographic characters the Multivariate analysis of Variance model was constructed to evaluate the respondents perspectives against rabies and its prevention

and control with respect to socio-demographic characters.

Scoring was carried as per the response of questions regarding Knowledge, Attitude and Practices. The number of questions for which the respondent gave positive responses were counted and this score was then categorized based on the median (Knowledge: <2= score 1, 4-6 = score 2, & >6 = score 3, Attitude :- 3-7 = score 1 & >7 = score 2, Practice: <4 = score 1 & 4-6 = score 2.

RESULTS AND DISCUSSION

Respondent demographic and socio-demographic characteristics: A total of 200 respondents were interviewed in the survey. Table 1 shows the MANOVA analysis of respondents with respect to socio-demographic characteristics. The median age of the respondents was 40 years (mean 41.5, range 18 to 65).

The number of questions to which the respondent positively responded was counted and the score was categorized

based on the median. The scores for Knowledge were <4= 42 (21%), 4-6 = 124 (62%) and >6 = 34 (17%). Similarly for Attitude, scores were 3-7 = 168 (84%) and >7= 32 (16%) and for Practices were <4 = 133 (66.5%) and 4-6 = 67 (33.5%).

Statistical analysis of the knowledge questions and perception regarding rabies

In Table 2 the results of bivariate χ^2 analyses of the respondent's knowledge and perception of rabies and rabies control measures in Jammu are given. About 75.8 percent of the respondents had heard of rabies. Of those respondents who had heard of it, majority believed rabies to be a dangerous and fatal disease. Also knew that it is transmitted by dog but can be prevented through vaccination and there are no locally available methods of treatment for rabid dog bite wound. About 64 percent of the respondents were aware that animal bite wounds should be washed with soap and water.

Table 1: Multivariate General Linear Model results of the demographic characters of respondents with respect to knowledge, attitude and perception of rabies

Variable	n (%)	Knowledge (p-value)	Attitude (p-value)	Practice (p-value)
Gender				
Male	152 (76)	0.026*	0.001*	0.000*
Female	48 (24)			
Age				
18-29	110 (55)	0.000*	0.000*	0.002*
30-41	48 (24)			
≥42	42 (21)			
Educational level				
Illiterate	22 (11)	0.000*	0.015*	0.700
High school	46 (23)			
Diploma	54 (27)			
Graduate/above	78 (39)			
Occupation				
Student	18 (9)	0.000*	0.002*	0.993
Farmer	24 (12)			
Employee	50 (29)			
Business	44 (22)			
Dependent/housewife	52 (26)			
Dog ownership status				
Yes	138 (69)	0.000*	0.001*	0.000*
No	62 (31)			
Persons in household				
≤5	110 (55)	0.000*	0.709	0.004*
>5	90 (45)			

**Table 2:** Descriptive and bivariate χ^2 analysis of responses to questions related to the knowledge and perception of rabies comparing dog owners with non dog owners as well as respondents living in urban and rural areas of Jammu

Variable	n%	Dog ownership status (%)		χ^2	O.R (95%CI)	p-value	Respondent's area of living (%)		χ^2	O.R (95%CI)	p-value
		Yes	No				Urban	Rural			
Heard of Rabies											
YES	75.8	95	82	8.303	4.18	0.004*	91.5	87.1	0.862	1.595	0.353
NO	24.2	5	18				8.5	12.9			
Believe its fatal											
YES	77	99	80	19.207	24.75	0.000*	98.9	80.9	18.00	21.43	0.000*
NO	23	1	20				1.1	19.1			
Believe rabies is transmitted by dogs											
YES	100	100	97	3.04	0.00	0.081	97		2.405		
NO	—	—	3				3	91.6		2.963	0.012*
								8.4			
Believe it is transmitted by other animals											
YES	21	28	19	2.253	1.673	0.133	92	79	6.816	3.055	0.009*
NO	79	72	81				8	21			
If dog owned, should it receive rabies vaccine											
YES	81	82.2	88	1.412	0.629	0.235	94	85	4.310	2.7625	0.038*
NO	19	17.8	12				6	15			
Believe that bite wound should be washed with soap and water											
YES	64	84	86	0.157	0.854	0.692	87	82	0.954	1.469	0.329
NO	36	16	14				13	18			
Believe that rabies can be prevented by vaccination of dogs											
YES	68	83	88	1.008	0.659	0.315	94	85	4.310	2.7625	0.038*
NO	32	17	12				6	15			
Believe that rabies can be treated by traditional healing											
YES	10	10	17	2.098	0.542	0.147	11	14	0.411	0.759	0.521
NO	90	90	83				89	86			
Believe that there are no locally available methods of treatment for dog bite and rabies?											
YES	15	13.4	15	0.166	0.874	0.684	13.7	84.6	1.008	0.028	0.864
NO	85	86.6	85				86.3	15.4			

There was significant difference between dog owners and non dog owners with respect to awareness of rabies (p-value=0.004*), and also believed that it being fatal (p-value=0.000). Similarly, there was significant difference (p-value=0.000*) between response of the participants from urban and semi-urban areas with respect to the belief that rabies is fatal, also believed that rabies is transmitted by animals other than dogs (p-value=0.009*), if people owned dogs it should receive rabies vaccine (p-value=0.038*), and believed that rabies can be prevented by vaccination of dog (p-value=0.038*). Fig. 1 depicts various answers of dog owners to the questions related to knowledge and perception.

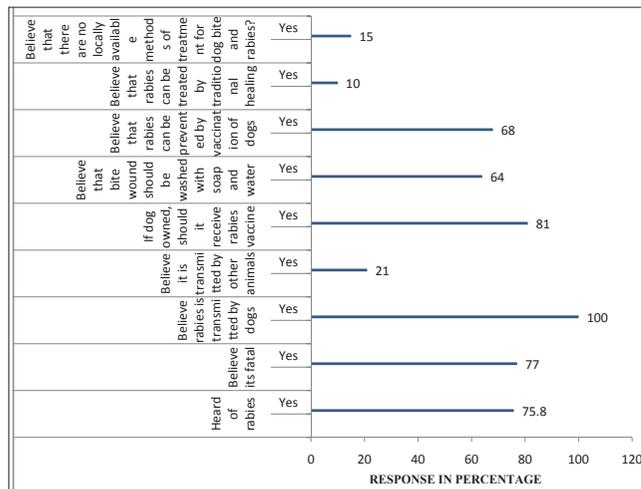


Fig. 1: Bar diagram showing the response towards the questions related to knowledge regarding rabies and perception of rabies regarding control and prevention

Statistical analysis of the attitude questions and perception regarding rabies

In Table 3 as presented the findings of bivariate χ^2 analyses of the respondent’s attitude and perceptions of rabies and rabies control programme in Jammu. Almost all the respondents reported that they would report to hospital for treatment if bitten by a stray dog, owned dogs, wild animals and vaccinated dog while comparing the response from urban and rural area dwellers, revealed a significant value (p-value=0.015*) about reporting to hospital for treatment if bitten by owned dog, about bite by wild animals (p-value=0.038*), about reporting to authorities if there is suspected outbreak of rabies in the

community (p-value=0.037*) and would kill stray dog if rabies is suspected (p-value=0.016*). Fig. 2 depicts various answers of dog owners to the questions related to knowledge and perception.

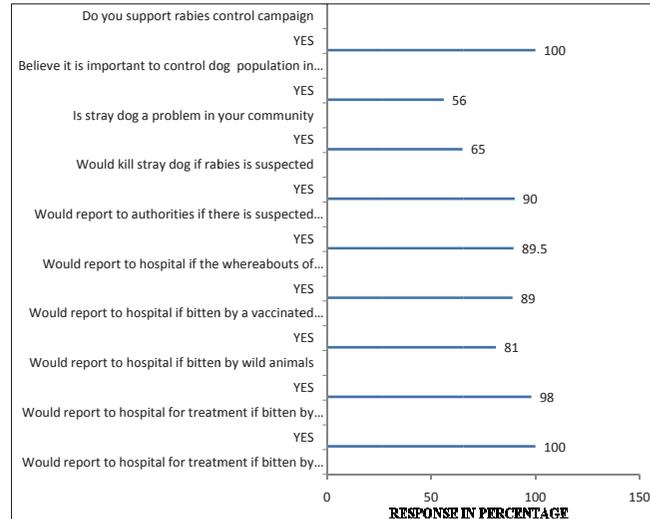


Fig. 2: Bardigram showing the response towards the questions related to attitude regarding rabies and perception of rabies regarding control and prevention

Analysis of data on the practice questions regarding rabies

The statistical analysis was not conducted for the respondent’s practice and perception of rabies and rabies control program in Jammu. This is because practice was done by only those respondents who were dog owners and more so, for conducting Bivariate analysis at least two variables need to be present which was not possible in this case. Table 4 & Fig. 3 depicts the frequency of dog owners against the questions regarding practices on rabies control program in Jammu.

Understanding community knowledge, attitude and perception of rabies is important because of their influence on post-exposure treatment seeking behavior (Matibag *et al.*, 2008) and also because the community support is essential for rabies prevention and control programme (Kayali *et al.*, 2003). Few studies have been conducted to understand knowledge, attitude and practices for rabies in India (Agarwal and Reddaiah, 2003; Singh and Choudhary, 2005; Ichhpujani *et al.*, 2006), Sri Lanka (Matibag *et al.*, 2007; Matibag *et al.*, 2008; Matibag *et al.*, 2009), and

**Table 3:** Descriptive and bivariate χ^2 analyses of responses to questions related to the community attitude and perception of rabies, comparing responses between dog owner and non-dog owner as well as respondents living in urban and rural areas of Jammu

Variable	n%	Dog ownership status of respondents (%)		χ^2	O.R (95%CI)	p-value	Respondent's area of living (%)		χ^2	O.R (95%CI)	p-value
		YES	NO				URBAN	RURAL			
Would report to hospital for treatment if bitten by a stray dog											
YES	100	100	100	—	—	—	100	100	—	—	—
NO	—	—	—				—	—			
Would report to hospital for treatment if bitten by owned dog											
YES	98	99	97	1.020	3.090	0.312	94	83.4	5.944	3.130	0.015*
NO	2	1	3				6	16.6			
Would report to hospital if bitten by wild animals											
YES	81	82.2	88	1.412	0.627	0.235	94	85.2	4.310	2.723	0.038*
NO	19	17.8	12				6	14.8			
Would report to hospital if bitten by a vaccinated dog											
YES	89	92	86	1.839	1.873	0.175	89	79	3.72	3.774	0.054
NO	11	8	14				11	21			
Would report to hospital if the whereabouts of biting animal are not known											
YES	89.5	91	88	0.479	1.378	0.489	93.5	85.6	2.684	2.729	0.101
NO	10.5	9	12				6.5	14.4			
Would report to authorities if there is suspected outbreak of rabies in the community											
YES	90	93	87	2.00	1.985	0.157	95.6	88.4	4.348	2.921	0.037*
NO	10	7	13				4.4	11.6			
Would kill stray dog if rabies is suspected											
YES	65	73	62	2.758	1.657	0.097	78	62.5	5.858	2.129	0.016*
NO	35	27	38				22	37.5			
Is stray dog a problem in your community											
YES	56	62.5	51	2.649	1.594	0.104	70.8	51	4.290	2.332	0.038*
NO	44	37.5	49				29.2	49			
Believe it is important to control dog population in Jammu											
YES	100	100	100	—	—	—	100	100	—	—	—
NO	—	—	—				—	—			
Do you support rabies control campaign											
YES	100	100	100	—	—	—	100	100	—	—	—
NO	—	—	—				—	—			

in North America (McGrill *et al.*, 1997; Goodwin *et al.*, 2002). Majority of the studies demonstrated a high level of people’s awareness regarding rabies.

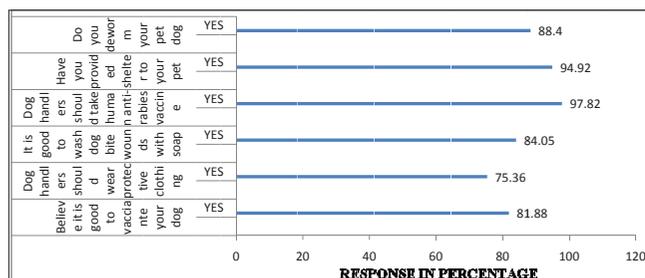


Fig. 3: Bardigram showing the response towards the questions related to attitude regarding rabies and perception of rabies regarding control and prevention

Table 4: Frequency of response of dog owners to various questions regarding practices

Questions	Frequency (%)
Believe it is good to vaccinate your dog	
Yes	113 (82.2)
No	25 (17.8)
Dog handlers should wear protective clothing	
Yes	104 (75.53)
No	34 (24.47)
It is good to wash dog bite wounds with soap	
Yes	116 (84)
No	22 (16)
Dog handlers should take human anti-rabies vaccine	
Yes	135 (98)
No	3 (2)
Have you provided shelter to your pet	
Yes	131 (95)
No	7 (5)
Do you deworm your pet dog	
Yes	122 (89)
No	16 (11)

Some studies have also reported about knowledge and perception of rabies risk among travelers travelling in rabies-endemic countries (Altmann *et al.*, 2009; Piyaphanee *et al.*, 2010). However, these studies revealed that people were applying chilli and turmeric powder, lime, kerosene oil, herbal paste or salt on the dog bite wound, or perform

folk remedies at home rather than seeking conventional treatment from health facilities (Agarvval and Reddaiah, 2003; Singh and Choudhary, 2005; Ichhpujani *et al.*, 2006; Sudarshan *et al.*, 2006; Matibag *et al.*, 2008).

The cross-sectional study conducted in order to know respondents knowledge, attitudes and perception of rabies and further investigating factors influencing their knowledge and perceptions about rabies was first such study in Jammu that provided valuable information on which to build a rabies awareness education programme. Study ensured that the respondents were interviewed both from urban and rural areas. Age group of people (≥ 42 years), sex(males), education level (graduate), occupation (employee & businessman), persons in household (<5), dog ownership status (yes) and location(urban) were found to be significant (p-value <0.05) with respect to questions related to knowledge, attitude and practice. The study showed nearly similar results as reported by Tenzin *et al.*, 2012 where the majority of the respondents had high level of knowledge and attitude and perception of rabies with a positive attitude towards the prevention and control of rabies. Regression model also showed better knowledge about rabies which was predicted by gender, educational level and dog ownership status of the respondents.

Present KAP studies revealed 75.8 percent having heard of rabies and 64 percent were aware to wash bite wound with soap and water. Understanding community knowledge through this study revealed high level of awareness among the respondents with dog ownership which may be due to endemicity of rabies, awareness through the news media about rabies. Findings from this study are in consonance with those from other studies in the south Asia that demonstrated a high level of knowledge of rabies and its transmission (Agarvval and Reddaiah, 2003; Sharma, 2005; Ichhpujani *et al.*, 2006; Matibag *et al.*, 2008; Matibag *et al.*, 2009). However, the current study also identified some knowledge gaps: as some of the respondents (24.2%) had not heard of rabies and its mode of transmission especially the rural area dwellers indicating lack of rabies awareness education in such parts of Jammu.

Understanding the community attitude and perceptions of treatment-seeking behaviours is considered important for rabies prevention in humans (Matibag *et al.*, 2008). Immediate post exposure prophylaxis (PEP) is required to neutralize the rabies virus in the wound before it spreads into

the central nervous system and brain (Warrell and Warrell, 2004; WHO, 2010). This study showed good treatment-seeking behaviours as a majority of the respondents would report to the hospital for animal bite wound treatment. However, such reporting about the animal bite wounds to the hospital were higher for in owners of dogs, and those from urban area.

These findings are comparable with studies reporting that a large number of people visited the hospitals for rabies PEP following dogs bites, touching/feeding of rabid animals and ingestion of meat and dairy products derived from rabid animals in Bhutan (Tenzin *et al.*, 2011). This evidence supports the current finding that the people in urban area have good health-seeking behaviours. It is possible that children would often interact with dogs resulting in dog bite injuries, but probably do not report the incident to their parents or to the hospital owing to lack of awareness of rabies (Dodet *et al.*, 2010). Furthermore, studies in other countries have shown that children are more often bitten on the head and neck, which carries a much higher risk than bites to other parts of the body (Pancharoen *et al.*, 2001; Cleaveland *et al.*, 2002; Knobel *et al.*, 2005). Further studies should be conducted to confirm this proposition, and if found to be correct, awareness and education should be planned targeting children.

Bivariate χ^2 analysis was conducted with respect to dog ownership status and location of respondents. The results of study were comparable with those of Tenzin *et al.* (2012). A significant difference was found between dog owners and non-dog owners with respect to awareness of rabies (p-value=0.004*), and belief that it is fatal (p-value-0.000*). Significant difference (p-value-0.000*) between response of the participants from urban and semi-urban areas with respect to the belief that rabies is fatal. Significant results that rabies is transmitted by other animals other than dogs (p-value=0.009*), if dog owned it should receive rabies vaccine (p-value=0.038*) and believe that rabies can be prevented by vaccination of dog (p-value=0.038*).

The study results shows that male respondents had better knowledge about rabies but they are less likely to report animal bite cases to the hospital. This is not surprising because it is well documented that compared to women, men in general have limited contacts with physicians and seek less healthcare services (Mansfield *et al.*, 2003; Galdas

et al., 2005; Smith *et al.*, 2006). It is assumed that several factors might be involved in men's decisions, including masculine ideologies regarding seeking help when faced with illness or problems (Galdas *et al.*, 2005; Smith *et al.*, 2006). This is comparable to field observations that of the 12 human rabies deaths in Bhutan (from January 2006-April 2011), 11 (92%) were males but most (75%) were children under 15 years of age.

The current results also indicate that the attitudes of the respondents were positive: the majority mentioned that they would report suspected rabies outbreaks in the community to the appropriate authorities for investigation. The majority of respondents also believed that stray dogs are a public health problem in the community and would support a dog population control programme. Community support of, and participation in a rabies control programme is important in order to achieve good coverage of vaccination (>70 %). This is necessary to break the chain of infection and to prevent the maintenance of rabies in the dog population (WHO, 1992; Coleman and Dye, 1996).

CONCLUSION

The present study indicates more awareness amongst the dog owners and urban area dwellers regarding rabies and its control and measures to be taken to avoid health hazard caused due to it. KAP studies revealed that 75.8 percent have heard of rabies and 64 percent were aware to wash bite with soap & water. Demographic characters with respect to questions revealed strong association of educated respondents, having dog ownership status, dwellers of urban area and males with respect to Knowledge, Attitude and Practice. There was comparatively good approach towards Rabies knowledge and attitude amongst respondents with dog ownership and those living in urban location. Good practices prevail in dog owners with high frequency of respondents showing positive responses. But there is a need to aware rural area dwellers about the disease, its control and prevention.

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