

Design and Validation of a Persian Knowledge, Attitude, and Practice Questionnaire for Rabies (PKAP-Rabies) in the General Population of Iran

Maryam Fazeli¹, Mahsa Golahdouz¹, Rouzbeh Bashar¹, Masoumeh Arab Baferani¹, Amin Doosti-Irani², Behzad Pourhossein³, Sana Eybpoosh^{4*}

¹National Collaborating Center for References and Research on Rabies, Department of Virology, Pasteur Institute of Iran, Tehran, Iran; ²Department of Epidemiology, School of Public Health, Hamadan University of Medical Sciences, Hamadan, Iran; ³Department of Virology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; ⁴Department of Epidemiology and Biostatistics, Research Centre for Emerging and Reemerging Infectious Diseases, Pasteur Institute of Iran, Tehran, Iran

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Introduction: Rabies is a highly fatal disease. However, it is quite preventable. Community awareness about rabies is one of the key components for prevention, which should be assessed and routinely monitored by standard questionnaires. We aimed to develop and validate a Persian knowledge, attitude and practice questionnaire for rabies (PKAP-Rabies) in the general population of Iran. **Methods:** The questionnaire was developed based on existing literature and conducting focus group discussions with experts in the field. Content, face, and construct validity were checked by gathering the opinion of 10 experts in the field. Test-retest reliability was assessed by re-administering the questionnaire to the same individuals after a 15-days interval. **Results:** The questionnaire consisted of 64 items, covering five domains including 'demographics' (19 items), knowledge about animal and human rabies (14 and 10 items, respectively), attitude towards rabies prevention in animals (6 items), and practice towards rabies prevention/control (14 items). The questionnaires were mainly filled by young (mean= 28.6, SD= 10.3 years) women (63.3%) with a university-level educational background (36.7%). Most knowledge questions had a proper difficulty level (average difficulty index= 20-80%). Wilcoxon test also showed proper test-retest reliability for this questionnaire ($P_{\text{Wilcoxon}} > 0.05$). **Conclusions:** The PKAP-Rabies questionnaire appeared to be feasible, valid and reliable for assessing KAP towards rabies in the general population of Iran with potential application in future large-scale surveys. Information from such surveys can provide insight into adopting prevention and control measures, and would allow us to evaluate the impact of current and upcoming interventions. *J Med Microbiol Infect Dis, 2018, 6 (2-3): 67-71.*

Keywords: Rabies, Knowledge, Attitude, Practice, Iran.

INTRODUCTION

Rabies is an acute and fatal zoonotic disease caused by the viruses of the *Lyssavirus* genus of *Rhabdoviridae* family. The virus circulates among wild and domesticated carnivores and affects mammals including human. Transmission of Rabies is commonly through the bites of rabid animals or contact of virus-contaminated saliva of infected animals with broken skin, mucous membranes, eyes, mouth, anus, and vagina [1]. Domestic dogs are the main reservoir and transmitter of this disease particularly in developing countries [2]. The canine rabies is responsible for an estimated 60,000 human deaths per year, especially in Asia and Africa [3].

The disease is fatal with no effective treatment after the appearance of clinical symptoms. However, timely post-exposure prophylaxis (PEP) can effectively prevent deaths in exposed individuals. Vaccination of animals is also an effective way to control virus circulation in the reservoir population [4]. These preventive efforts, however, are expensive, imposing a substantial economic burden on health systems [5]. Annually, around 10 million people

receive PEPs [6]. The annual cost of rabies prevention in Africa and Asia is estimated to be around US\$ 583.5 million, most of which allocated to PEP [1]. Despite these efforts, rabies still takes its toll in these areas and cause human deaths. Most deaths are due to lack of knowledge about the required actions and unavailability of healthcare services [7].

An inexpensive and practical approach to prevent rabies is to avoid animals bite and reduce the possibility of exposure to the virus [4, 8].

***Correspondence:** Sana Eybpoosh

Department of Epidemiology and Biostatistics, Research Centre for Emerging and Reemerging Infectious Diseases Pasteur Institute of Iran, No. 69, Pasteur Ave, Tehran, Iran, 1316943551.

Email: s_eybpoosh@pasteur.ac.ir

Tel: +98 (21) 64112121

Fax: +98 (21) 66465132

www.SID.ir

<http://jommid.pasteur.ac.ir>

Inadequate knowledge or improper attitude and practice towards rabies, predisposes the community to the infection, especially in high-burdened areas. The community needs to be aware of the risks associated with rabies, and the required actions to prevent human infection [4]. A preliminary step in this regard is to identify gaps in the community's knowledge, attitude, and practice (KAP) towards rabies.

To the best of our knowledge, there is no published survey and a standard questionnaire on KAP towards rabies for the general population of Iran. This study aims to develop and validate a questionnaire for the general population in Iran for the first time.

MATERIAL AND METHODS

The Persian KAP toward rabies (PKAP-Rabies) questionnaire is required to investigate the knowledge, attitude, and practice of the general population towards rabies symptoms and prevention. To develop such a questionnaire for Iran, first, we overviewed rabies questionnaires currently available worldwide. We also used the questionnaire designed and proposed by the World Health Organization (WHO) for rabies prevention [3]. The resulting content was then translated into the Persian language in order to reach a preliminary inclusive bank of questions.

To assess the validity of the questionnaire, we followed a subjective approach. In this regard, 'face and content validity' of the preliminary questionnaire was first evaluated by the research team in a focus group discussion (FGD) [9], and consensus changes in the appearance and content of the questionnaire were applied. The revised questionnaire was distributed to 10 rabies expert via emails

[10], and they were asked to assess if a) the questions under each domain (*i.e.*, knowledge, attitude, and practice) entirely cover and match to that domain (construct validity) [8]; b) the questions match the cultural context and lifestyle of the general population of Iran; c) the questions under each construct has a logical and appropriate sequence; and d) questions are comprehensible by the general population (It was also asked if any modifications in the wording of the questions were required).

Comments of the experts were gathered and discussed by the research team in an FGD. Required consensus modifications were applied. The resulting questionnaire was then answered by 30 individuals, who were randomly recruited from the general population of Iran. The Respondents' feedbacks were checked and applied in the questionnaire. In order to determine the test-retest reliability of the Rabies KAP questionnaire, participants underwent the same test again two weeks after they first answered the questionnaire.

Statistical analysis. Data were analyzed using the Stata software (version 14). The information gathered via the questionnaire was coded into variables. Normal distribution of quantitative variables was tested using the Kolmogorov-Smirnov test, and normal and non-normal quantitative variables were described with the mean (standard deviation [SD]), and median (interquartile range [IQR]), respectively. Categorical variables were described using number and percent.

Item difficulty was calculated for the questions in the 'knowledge' domain. Item difficulty refers to the proportion of respondents that responded to the item correctly. The item difficulty index was calculated using the following formula.

$$\text{Item Difficulty Index} = \frac{\text{Number of correct responses to each knowledge item}}{\text{Total number of responses (both correct and incorrect)}}$$

A higher value of difficulty index indicates a lower difficulty level of each item. The recommended threshold is to exclude those knowledge items that are answered correctly by less than 20% or more than 80% of respondents [11]. For reliability measurements, the Wilcoxon test was applied to the results of the pre- and post-tests. The Wilcoxon test checked if participants scores differed significantly within a time interval of two weeks. A significant test result was considered as substantial variation in participants' scores and was considered as an indication of poor reliability.

Ethical consideration. Participating in the study was voluntary. Participants were verbally informed about the purpose of the study with emphases that their answers will be kept confidential. Only persons who verbally agreed were interviewed.

RESULTS

The overall Persian questionnaire consisted of four main domains preceding a section that assessed 'demographics' and 'background history.' The demographics section

included questions on respondent's age, gender, occupation, spouse's occupation, educational level, the area of residence, household size, and the number of deaths within the household in the past year. The background section checked for any previous animals exposure in the members of the respondent's family as well as rabies in their domestic animals/pets. The four crucial domains included: a) knowledge about animal rabies; b) knowledge about human rabies; c) attitude towards rabies prevention in animals; and d) practice towards rabies prevention and control in humans and animals.

Knowledge items on animal rabies reflect information regarding animal rabies awareness, symptoms, outcomes, vaccination, and control strategies. This domain consisted of 14 multiple choice items, each with the "Yes," "No," and "Not Sure" choices. Only the "Yes" option was the correct answer, receiving one point. Incorrect and "Not Sure" answers received zero points. Possible scores for animal rabies knowledge domain ranged from 0 to 14. The same was true for the knowledge items on human rabies domain. This domain consisted of 10 multiple choice items, including "Yes," "No," and "Not Sure" options, with a

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scoring system similar to the animal knowledge domain. So, possible scores for human rabies knowledge domain ranged from 0 to 10.

Attitude items defined as the respondent's opinions and belief towards prevention, vaccination, and control of rabies in their real/hypothetical pet or domestic animal. This domain consisted of six Likert scale questions. The respondents could indicate their degree of agreement with each given statement through a five-point Likert scale. Numerical scores of 5, 4, 3, 2 and 1 are given to the choices reflecting "strong agreement," "agreement," "not sure," "disagreement," and "strong disagreement" with a statement, respectively. Possible scores for the attitude domain ranged from 6 to 30.

Practice towards rabies prevention and control in human and animal consisted of 14 items. This domain corresponded to the respondents' practice towards rabies vaccination, timely actions after an animal bite and diseases control in domestic animals. To provide a better reflection of the respondents' actual practice toward rabies prevention and control, the items under this domain were not

numerically scored. The number of the respondents selected each option under a given item in this domain are described independently. The Items of the PKAP-Rabies questionnaire are reflected in Supplementary File 1.

The final questionnaire was used for 30 individuals. Most participants were female (n=19; 63.3%) with a mean age of 28.6 ± 10.3 yr. The participants were mainly from Tehran and Alborz provinces. Most participants had university education (36.7%; Table 1). Most knowledge items had a difficulty index of 20-80%, suggesting that the content of the knowledge questions was relatively appropriate for the target population (Table 2). Median scores of participants' knowledge towards animal and human rabies were 10 (IQR= 7, 11) and 9 (IQR= 7, 11), respectively. Median score of attitude items was 55 (IQR= 45, 57) showing a proper attitude towards rabies prevention and control. Median score of these domains did not show a significant difference between baseline measurement and the re-test measurement, suggesting good reliability and repeatability of the questionnaire ($P_{\text{Wilcoxon}} > 0.05$). Table 3 shows the results of the "practice domain."

Table 1. Background characteristics of the study participants

Background characteristics	N (%)	
Age Mean \pm SD	28.6 \pm 10.3	
Sex		
Male	11 (36.7)	
Female	19 (63.3)	
Educational level	Illiterate	0 (0)
	Elementary	2 (6.7)
	Mid-level	7 (23.3)
	High-school/Diploma	10 (33.3)
University level	11 (36.7)	
Household dimension Median (IQR)	4 (3, 5)	
Cases of animal bites in the family	0 (0)	
Cases of animal diseases in the house	Yes	4 (13.3)
	No	26 (86.7)
Number of animal deaths due to disease	2 (6.7)	

IQR= Interquartile range

Table 2. Difficulty index of knowledge items

Practice items	Difficulty index
Knowledge about rabies in animals	
Have you ever heard about rabies disease in animals?*	-
Have you ever seen a rabid animal?*	-
Do dogs die from rabies?	0.80
Do you know where to afford rabies vaccine for animals?	0.67
Are you aware of animal sterilization methods?	0.52
Do the below items reflect signs and symptoms of a rabid animal?	
Stopping to eat or drink	0.75
Vomiting	0.68
Increased saliva secretion and oral frosting	0.68
Tremor and odd behavior	0.71
Aggression and biting	0.90
Respiratory distress	0.70
Escape and isolation	0.85
Imbalance and falling down	0.70
Knowledge about rabies in human	
Have you ever heard about rabies disease in human?*	-
Have you ever seen a rabid human?*	-
Do humans die from rabies?	0.89
Is post-bite vaccination effective in rabies prevention?	0.51
Do you know where you can get vaccinated against rabies?	0.62
Do the below items reflect signs and symptoms of a rabid human?	
Sudden initiation of the disease	0.41
Fear of water (Hydrophobia)	0.71
Fear of Light	0.70
Fear of wind blowing	0.69
Aggression	0.90
Lack of consciousness	0.73

* Difficulty index is not computed for these items as the answers cannot be considered as true/false.

Table 3 Respondents' practice towards rabies

Practice items	N*
Do you keep animals/pets in your house?	
Yes	9
No	21
If you keep animals in your house, please respond to the followings:	
Number of animals you keep in the house (except birds and rodents)**	1 (1, 3)
Reasons for keeping animals in the house:	
To protect my herds safe from wild animals	0
To accompany my domestic animals	0
To protect my family safe from others and alarm if anybody comes in	3
For sale and business	0
As a hobby/To fill my loneliness	9
Other reasons	4
What kind of foods do you give your pet/animal?	
Home-made cooked foods	7
Left-over foods of the family	5
Commercial pet foods	8
Others	3
Does your pet/animal receive food from other sources?	
Yes	3
No	5
I do not know	1
Do you always keep your pet/animal in the yard or the open place of your house?	
Yes	3
No	6
Do you always use the collar for your dog(s)?	
Yes	3
No	6
Does animal breeding and sale occur in your house?	
Yes	0
No	9
If yes, how many animals are being sold each year?	0
Have you ever vaccinated your pet/domestic animal against rabies?	
Yes	7
No	0
I do not know	2
How many times you have done rabies vaccination for your pet/domestic animal?***	1 (1, 2)
Have you sterilized your animal(s)?	
Yes	4
No	4
I do not know	1
Have you been vaccinated against rabies?	
Yes	3
No	3
I do not know/I do not remember	3
Have you done rabies vaccination following animal bite?	
Yes	2
No	1
I have not been bitted at all	6
What will you do if an animal (domestic or wild) bites you?	
I will clean my wound by myself.	4
I will use wound bondage.	4
I will do rabies vaccination.	7
I will follow traditional methods to protect and heal my wound.	3
All of the above	8

* As the total number of respondents who kept animals/pets in their house was smaller than 10, we only reported the crude numbers in this table without calculating percents. ** Reported numbers are median (Interquartile ranges)

DISCUSSION

To our knowledge, the present questionnaire is the first one developed to assess the level of KAP towards rabies among the general population of Iran.

The questionnaire is written in plain language, making it applicable to a broad range of participants. This feature was evident by a low difficulty index seen for most questions on the 'knowledge' domain. Completion of each questionnaire also took an average of 10 min. These features make this questionnaire an efficient tool for large scale surveys assessing KAP towards rabies.

Our sampling approach yielded a population consisted mainly of university-educated females. This sample might be not a real representative of the entire target population that comprise people of lower educational levels. Therefore, it is recommended that future studies that recruit individuals from various socioeconomic status (*e.g.*, people with lower educational levels, or males at high-risk jobs), first perform a pilot testing of this questionnaire in their samples. This is to assure that all questions can be clearly understood and responded by the study participants and to check if modifications are needed in the questions.

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Regarding the comprehensiveness of the questionnaire, all possible items were included in the questionnaire. Some of the questions in the “practice” domain of the questionnaire are specifically developed for individuals who own domestic animals or pets. These questions cannot be answered by individuals who do not own domestic animals or pets in their house. So, proper guidance on not responding these questions should be provided to such individuals at the beginning of data collection.

In this study, we did not perform principal component analysis to reduce the number of items in the rabies KAP questionnaire. This can be conducted in future research in order to reach a short version of the rabies KAP questionnaire. While the current questionnaire took about 10 minutes to complete, a shorter version might be suitable for specific contexts, such as KAP assessments for high-risk jobs. The effect of questionnaire length on response rate and response bias has been repeatedly reported in the literature [12]. Longer questionnaires have also been reported to cause higher ‘response burden’ perceived by participants, which affects response quality and response rate. Response burden is defined as the amount of effort required by the respondent to complete the questionnaire [13].

This instrument was developed in the Persian language and validated for the general population of Iran. The questionnaire can be validated and adapted among other Persian-language countries. Adaptation process should be followed in light of environment, lifestyle and cultural contexts of these countries.

The PKAP-Rabies questionnaire appeared to be feasible, valid and reliable for measuring the level of KAP towards rabies among the general population of Iran. This measure can be used to provide a comprehensive evaluation of KAP towards rabies in the general population of Iran shortly. The data collected from such surveys can assist health authorities to adopt proper measures for prevention and control of rabies, with the following impact evaluation of such interventions.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest associated with this manuscript.

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