Original research article

Human Rabies: Knowledge and self-reported practices among grade ten school children in a suburban community in Sri Lanka

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Abstract

Background

Human Rabies continues to be a public health problem in Sri Lanka despite the conducive environment to eliminate the disease. Children are at high risk of contracting this zoonotic disease and specifically targeted awareness activities are recommended.

Objective

To describe the knowledge and practices regarding human rabies among grade ten students in a suburban community in Sri Lanka

Methods

A descriptive cross-sectional study design with multistage cluster sampling technique and probability proportionate to the size of the grade ten student population in state schools was used to sample 694 students. Structured pre- tested, self-administered questionnaire was used for data collection and descriptive statistical analysis was used.

Results

A majority (68.2%, n=473) had poor knowledge regarding human rabies. Although 99.6%, (n=691) had heard of rabies only 26.3% (182), identified lick of infected animal on mucous membranes as a mode of transmission. Only 41.2% (285) knew that wounds should be cleansed with antiseptics. Among those who had experienced harm by an animal (n=126), 65.9%, (n= 83) had followed the correct first-aid practices while 73.02% (n= 92) had obtained medical treatment following the exposure.

Conclusion

A majority of students had correct practices but poor knowledge pertaining to the prevention of human rabies.

Keywords

Human Rabies, school children, suburban areas, preventive practices.

Introduction

Rabies is classified as a neglected tropical disease (1). Despite the fact that definite successful pre-exposure prophylaxis as well as post-exposure prophylaxis is currently available for human rabies, yearly more than fifty five thousand people succumb to this deadly disease in the world. Fifty six percent of these deaths occur in Asia (2).The deaths due to human rabies in Asia and Africa alone amount to 1.74 million Disability Adjusted Life Years (DALY) lost each year. The psychological impact of the trauma of the bite and post-exposure prophylaxis further results in 0.04 million DALY's each year (3). Seven point five million patients receive post-exposure treatment in Asia annually (4). Accurate values could be much higher due to the gross under reporting of human rabies cases in these countries (5). Children are the main victims of this deadly disease (6). Sri Lanka has also been rated among the first ten countries in the world which reports high fatalities of human rabies (7).

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A lack of knowledge regarding human rabies as well as regarding responsible dog ownership has been identified as a major cause for the sustained presence of this 4000 year old disease in the modern world (2). Dog bites are the major cause for human rabies in Sri Lanka. Thus, elimination of human rabies from Sri Lanka is totally dependent upon the elimination of canine rabies (2).

Rabies control activities were first introduced to Sri Lanka during the British Colonial era through the Rabies Ordinance of 1893 (5). A national programme to control rabies was introduced to Sri Lanka in 1975 with the establishment of the National Rabies Control Programme run by the Public Health Veterinary Services of the Ministry of Health (2). This had a significant effect on the reduction of the number of human rabies deaths in Sri Lanka with the number declining from 377 in 1973 to 28 in the year 2012. At present the country is working towards the goal of eliminating human rabies by the year 2016 (8).

Statistics indicate that 500,000 dog bite victims had been administered post-exposure prophylaxis for the year 2012, with nearly 2000 dog bites being reported daily (9). Nearly 583.5 million US$ is being spent yearly on the prevention of human rabies (10) the bulk of which is for the procurement of post-exposure prophylaxis, which amounts to 10-20% of the country's expenditure on drugs and vaccines (11).

Successful rabies control programmes with effective universal vaccine coverage and dog control methods acceptable to local, cultural and religious attitudes could help Sri Lanka achieve the rabies free status (12). The WHO Strategies for the Control and Elimination of Rabies in Asia identifies children in the age group of 5-15 years as at risk of contracting rabies and recommend awareness activities to be specifically targeted towards this high risk group (13-15).

It was thus necessary to obtain the levels of the knowledge and practices of school children in order to implement targeted interventions. Schools in a suburban area, Nugegoda Education Division were chosen. The objectives were to assess the knowledge and preventive practices related to human rabies among grade ten school children in this suburban area.

Methods

This was a descriptive cross-sectional study conducted during the period of July 2012-December 2012. The study population included school children in grade ten from Type 1AB (Schools with classes up to General Certificate in Education - advance level in science, commerce and arts) and 1C (schools with classes up to G.C.E. A/L only in commerce and arts) schools.

The sample size was calculated using the formula for estimation of proportions in descriptive studies (16). A standard normal deviate for specified alpha error was set at 1.96 which corresponds to 95%, while precision was set at 0.04. Expected prevalence of 'good' level of knowledge regarding rabies among grade 10 school students was estimated as 50% in the absence of this information, to get the maximum sample. The size of the sample from the above calculation was 600. As cluster sampling was used, the sample size was multiplied by the design factor, taken as 1.1 to overcome the design effect. This together with an allowance of 5% non-response rate, the final sample size was 694 students.

The study was conducted among six schools. Firstly, five Type 1 AB schools and one Type 1C school were selected randomly, proportionate to the grade ten student populations in these

schools. Stratified cluster sampling technique was used with a class of 30 students in grade 10 being considered as a cluster. The number of clusters allocated to the two types of schools was based on the proportion of grade ten students in each type of school. In selecting the clusters, the classes of grade ten in each school were listed and the required number of clusters was selected randomly from the list. In classes with more than 30 students, random selection was done from the class register. Once the cluster was selected, the students in that class were invited to participate in the study.

Prior to data collection written authorisation was obtained from the Zonal Education Director of the Sri Jayawardenepura Education zone. The school principals gave verbal permission. An Information Sheet was given to every parent or guardian. All parents contacted gave informed consent to their children's participation. All students in the sample were present on the days of data collection.

A structured, pre-tested, self-administered questionnaire with three sections was used. The first section collected basic demographic and social data. The second section had questions about knowledge of rabies. Practices pertaining to the prevention of rabies were included in the third section.

Recall bias was minimised by asking about practices at the time of data collection or in the recent past; the few past events asked about were major events.

The Statistical Package for Social Sciences (SPSS), version 18.0 software was used for data analysis. Socio-demographic characteristics of the study population were described using frequency distributions. Knowledge level was assessed by scoring each stem of the 24 questions assessing the knowledge. These questions were categorised into three groups on the basis of 'must know knowledge', 'good to know knowledge' and 'nice to know knowledge'. Each stem of a must know question was awarded 10 marks, each stem of a 'good to know' question was awarded five marks and each stem of a 'nice to know' question was allocated two mark. Thus, the possible minimum score was 'zero' marks and the possible maximum score was '586' marks. Calculating percentage of the total scores the students with a score of 60% or more were categorised as having a 'good' level of knowledge regarding rabies while those with a score below 60% were categorised as having a 'poor' level of knowledge regarding rabies. This mark was the addition of the score as a percentage of the “must know” knowledge questions and was decided upon prior to the analysis.

Individual practices are described as frequency distributions.

Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, Colombo, Sri Lanka.

Results

The study included 694 subjects with a response rate of 100.0%.

Basic characteristics of the study population

The mean age of study population was 14.7 years (SD = ± 0.6years; CI= 14.6-14.7) while 57.9%(n=402) of the students were males. A majority were Sinhalese (96.0%, n=666) Buddhists (93.8%, n=651)

The majority (52.4%, n= 364) attended 1AB schools while most of the schools attended by the study subjects were not designated as health promoting (65.0%, n=451) and most students

were unaware of the presence of school health clubs in their schools (52.7%, n= 366).

The study subjects were also categorised according to the highest education level of their parents. Most mothers (37.4%, n= 260) and fathers (42.6%, n= 295) were of an education level of studying up to or completed the G.C.E advanced level examination though a fairly high number (19.2%) and 21% were not aware of this information.

Knowledge regarding human rabies

Almost all students (99.6%, n=691) had heard of rabies. Of the 691 students who had heard of rabies, 99.1% (n= 688) of students correctly identified the dog as the commonest animal which transmits the infection to humans. The students were asked about several aspects of knowledge regarding rabies and the proportions who responded accurately are presented.

Table 1: Frequency distribution of those who responded correctly to the questions assessing rabies knowledge among study subjects who had heard of rabies

Aspects of knowledge regarding rabies	Number (n=691)	Percentages
Mode of transmission		
By a bite of an infected animal	604	87.4
By a lick from an infected animal on an open wound	375	54.3
By a lick from an infected animal on mucous membranes	182	26.3
By a scrape of an infected animal	435	63
Actions to be taken following an encounter with an animal		
Wash well with flowing water and soap	587	84.9
Apply an anti-septic on the site	285	41.2
Seek medical advice	572	82.8
Fatality of Rabies		
100% fatal	228	33
Prevention of rabies among dogs		
vaccination of dogs	508	73.5
dog sterilisation	22	4.7
Whether or not the students had heard of the term "Responsible dog ownership"		
Yes	103	14.9

Although 87.4% of students who had heard of rabies identified the bite of an infected animal as a mode of transmission, only 26.3% (182), identified a lick of an infected animal on mucous membranes as a mode of transmission. Further, though 84.9% were aware that the site of harm should be washed with flowing water, only 41.2% (285) were aware that the wound should be cleansed with antiseptics. Only 33% of the study units (n= 228) knew that rabies infection was 100% fatal. Only 4.7% (n = 22) of the study units who had heard of rabies correctly identified sterilisation of dogs as a rabies preventive strategy. However 73.5% identified the sterillisation of dogs as a preventive strategy. The majority of the study population (n=588, 85.1%) had not heard of the term responsible dog ownership.

The majority of the students 68.2% (n=473) were found to have a poor knowledge regarding rabies (Table 2).

Table 2. Frequency distribution of the study population according to the level of knowledge regarding rabies

Knowledge level	Number	Percentage
Good	**221**	**31.8**
Poor	**473**	**68.2**
Total	**694**	**100.0**

Practices regarding the prevention of human rabies

The students were also asked about several aspects of practices regarding the prevention of human rabies at personal level and household level.

Table 3: Frequency distribution of the study population who reported correct practices related to prevention of rabies at personal and household level

Practices	Number (n=691)	Percentage
Fondle stray dogs		
No	579	83.4
Fondle stray cats		
No	570	82.1
Presence of stray dogs at school		
No	313	45.1
Presence of stray cats school		
No	105	15.1

The majority of the students were not in the practice of fondling stray dogs 83.4% (n= 579) and stray cats 82.1% (n=570) (Table 3).

A total of 334 (48.34%) students owned a dog in their family and the practices adopted by these students are given in of them (Table 4).

Table 4: Frequency distribution of the practices adopted by the students who owned dogs

Practices	Number (n-334)	Percentage
Whereabouts of the pet dog during day time		
Constrained within the premises	157	47
Free roaming on the roads	50	15
Roaming freely within the premises	127	38
Whereabouts of the pet dog during night time		
Constrained within the premises	148	44
Free roaming on the roads	36	11
Roaming freely within the premises	150	45
Vaccination status of dog		
Yes	250	74.9
No	84	25.1
Sterilisation of dog		
Yes	30	9.0
No	304	91.0

Fifteen percent were (n=50) were free roaming dogs during the day, while at night 11% (n=36) were roaming freely on roads. Although 74.9% (n= 250) had vaccinated their dogs during the past year only 9% (n=30) of the dogs were sterilised.

Only 18.2% (n=126) of students had been hurt by an animals and this had resulted in 142 injuries during the past year. The majority of students (n=89, 56%) had been injured by pet dogs. Most of the study units (30.2%, n=38) had been harmed on the road.

Of the injuries experienced by the study units the majority of injuries were bite wounds (67.5%), and most of the injuries (62%) were inflicted upon the lower limb.

Table 5: Frequency distribution of the practices adopted by the students who had been hurt by an animal

Practices	Number (n=142)	Percentage
Nature of harm		
Bite wounds	85	59.9
Scrapes	54	38.0
Lick on wounds	3	2.1
Site of the injury		
Lower limb	126	62
Upper limb	45	31.7
Head and Neck	9	6.3
Actions taken following an animal bite		
Wash well with flowing water and soap	83	65.9
Apply anti septic on the site	37	29.4
Health seeking behaviour following the injury		
Sought medical treatment	92	73.02
Did not seek medical treatment	44	26.98

Only 29.4% (n=37) of the study units had applied antiseptics on the wound site. The majority of victims (73.02%, n= 92) had obtained medical treatment following the exposure (Table 5).

Discussion

Lack of knowledge, and unfavourable practices, have been attributed as one of the main reasons for the persistence of human rabies within the world (14). Evidence points out that children are mostly affected by the disease (6) justifying the study population of this study The school

dropout rate in Sri Lanka is 15% (18) at this age group highlighting the suitability of schools as the setting to approach the study units.

The majority of students (68.2%) were found to possess a poor knowledge regarding rabies though a study by Damboragama (1999) revealed that 32.6% of the study population possessed poor knowledge(19) and Fallahian, et al., (2010) indicated that 21.5% had poor knowledge (20). Though these studies assessed knowledge via a questionnaire, the present study allocated more marks for essential knowledge and hence participants who did not know these areas lost more marks. The other studies did not have a weighted marking system for core knowledge which could be the reason for this difference.

However, in our study 99.6% of the study units had heard of rabies which was higher than many other studies (21-23).

In our study only 33% of the participants identified that rabies was 100% fatal. Unawareness of the fatality of rabies hinders practicing preventive measures. Only 26.3% of the students in the study knew that a lick of a rabid dog on mucous membranes results in transmission of the disease. Similar findings were seen in a study by Koruk, Koruk, Kutlu, (2011) where only 44% were aware of this mode of transmission (24) emphasising the need for increasing awareness regarding all the modes of transmission among children.

In our study, 84.9% of study units declared that the site of the exposure to the animal should be washed with flowing water and soap as compared 64.3% who responded the same in the study conducted among general practitioners in Turkey (25) This may be due to the fact that these instructions have been included in the Sri Lankan school syllabus. These results in the present study are encouraging as the WHO stresses on the importance of this physical and chemical treatment to prevent the entry of the virus at the wound site (13). Similar to most Sri Lankan studies (26) a majority in the present study (82.8%) stated that they would seek medical advice following an animal exposure.

Only 67.6% of the respondents in the present study recognized that rabies was preventable, which is a concern. Rabies being preventable is the foundation of any control measure and thus it is of prime importance that children, who are especially at risk of rabies, are made aware of this important aspect. The study units were also questioned regarding responsible dog ownership. Only 14.9% had heard of this term. The importance of this knowledge is highlighted in the presence of 48.1% of the study units owning a pet dog at the time of the study.

A majority of students in the study were found to have correct practices pertaining to the prevention of rabies.

The proportion of dog owners (48.34%) was lower than that observed in a study by Matibag, et al., (2007) in Kandy where 58.1% owned dogs(26). Although the majority of the dogs owned by the students were vaccinated (74.9%) during the past year only 9% of the dogs had been sterilized. Dog sterilization is an important aspect of rabies elimination in that it is one of the strategies for dog population management. A 70% female dog sterilization rate is necessary to maintain a zero population growth among the dogs (2). When the dog population rate does not increase it prevents the spread of rabies.

The proportion of dogs who are vaccinated however is satisfactory and comparable to the vaccination rates observed in the study conducted by Matibag et al., (2007) in a community in Kandy where 76.1% of the dogs were vaccinated during the past 1 year (26). A vaccination rate of more than 80% is needed to reduce the incidence of rabies in an area (2).

In the present study it is encouraging to note that the majority (65.9%) had washed the site of exposure with soap and water which is higher than that reported from other studies. (19, 27-28)

However, only 26.98% of the victims had not sought medical treatment following an animal exposure which was lower compared to the study conducted in Delhi (Agarvval and Reddaiah, 2003) where 40% of the victims had not sought medical advice (29).

Conclusion

Although most students indicated having correct practices pertaining to the prevention of human rabies specific aspects of knowledge related to primary prevention of rabies among adolescent school children in the suburban area was poor.

Competing interests

None declared.

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