

ORIGINAL RESEARCH ARTICLE

Perception and Practices Regarding Rabies among Animal Bite Victims: A Cross-sectional Study in a Rural Area of West Bengal

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ABSTRACT

Introduction: Rabies is a fatal but preventable disease that is highly prevalent in India. Inappropriate knowledge and practices related to the disease can impair post-exposure prophylaxis following an animal bite. This study assessed the levels of knowledge and practices regarding prevention of the disease among animal bite victims attending an anti-rabies clinic in a rural area of West Bengal and its associated predictors if any.

Methodology: This cross-sectional study was conducted from September to December 2020 among 139 adult animal bite victims attending Noapara Block Primary Health Center in West Bengal. Level of knowledge and practices were assessed by a 10-item and 5-item questionnaire respectively. Univariate and multivariable logistic regression analysis was done to find the associated predictors.

Results : Among all participants, 40.4% of them had poor knowledge, while 44.4% of the participants had poor practices related to the prevention of the disease. Traditional practices with regards to immediate management of the wound were found among 40.2% of the participants, while 35.7% of the participants consulted rural medical practitioners/traditional healers as first-choice for treatment. Multivariable logistic regression analysis showed that increasing age, primary or below educational level and lower socio-economic status to be significantly associated with poor knowledge and practices.

Keywords: Rabies; Knowledge; Practices; Animal bite; Rural West Bengal

Short Title: Perception and practices regarding Rabies

INTRODUCTION

Regarded as one of the major causes of viral encephalomyelitis, rabies or hydrophobia has been one of the oldest recognized diseases of public health concern affecting 150 countries and territories. Dogs have been identified as the major host transmitting the disease (canine rabies) and are almost invariably fatal once its symptoms are established. According to the World Health Organization, rabies is one of the major Neglected Tropical Diseases (NTD) responsible for 59000 deaths globally each year among which 95% of deaths occur in the developing countries of Asia & Africa.[1]

Despite its high fatality rate, a major boon associated with rabies is that it can be completely prevented by adequate wound care and timely vaccination. [2,3,4,5] Many Western European countries and the United States have achieved the elimination

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of rabies with stringent vaccination as well as controlling the population of dogs. But the condition of India is still very gruesome. Among South-East Asian countries, India contributes a major proportion of cases of canine rabies (20,000 cases annually) and reports about 36% of all rabies-related deaths in the world. [6]

This grim scenario is mainly due to insufficient knowledge as well as ignorance associated with post-exposure prophylaxis of the disease among the general population especially in the poor living in remote rural areas. [7] Moreover, unhealthy practices like inadequate wound management, delayed presentation at the health facility as well as several myths or beliefs related to treatment patterns following animal bite has potentially undermined the chances of reduction in the burden of rabies-related deaths in our country. [8,9]

Studies previously done in Tanzania, Morocco, Bangladesh, Nigeria and Sri Lanka have demonstrated insufficient knowledge and inadequate practices related to the prevention and control of rabies among the general population. [10,11,12,13,14] Studies in India have also found a low prevalence of adequate knowledge regarding the disease as well as following inappropriate protocols in preventing the disease. [15,16,17,18] Lack of proper knowledge & harmful traditional practices and taboos related to the disease can act as a barrier for proper utilization of appropriate health services provided for animal bite management. Thus, further research is needed in this domain for identifying and dismantling these barriers especially in the context of eastern India. With this backdrop, this study thus envisaged assessing the quantum of knowledge and practices related to the prevention of rabies and its associated factors among victims of animal bites attending an anti-rabies clinic (ARC) at a primary healthcare facility in a rural area of West Bengal. The findings of this study would serve as an important piece of evidence for policy makers which will help them in implementing strategies to improve the level of knowledge and practices related to rabies among the rural population of India.

MATERIALS AND METHODS

This cross-sectional study was conducted from September to December 2020 among adult victims of animal bites attending ARC at Noapara Block Primary Health Center situated in Purba Bardhaman district of West Bengal. Participants who did not give written informed consent or were critically ill were excluded from the study.

SAMPLING

A previous national-level survey conducted across several states of India by Masthi et al found 60.4% of their participants to have some knowledge related to rabies. [19] Considering $P = 0.604$ and relative error of precision = 15% of P , the minimum sample size estimated using standard Cochran's formula came to be 63. [20] Adding a design effect of 2 and considering 10% non-response allowance the final sample size was 139.

On average, 50 adult victims of animal bites availed services for the anti-rabies vaccine at the ARC every day. Thus, 139 participants were selected by systemic random sampling by taking every 3rd patient who attended the ARC (sampling interval = 3).

DATA COLLECTION, STUDY TOOLS AND PARAMETERS USED

The study was conducted with the help of a pre-designed pre-tested structured questionnaire translated into the local language (Bengali) through face-to-face interview which encompassed the following domains:

- (a) Socio-demographic characteristics and bite profile of the study participants
- (b) Knowledge and practices with regards to the prevention of rabies among the study participants were assessed by a 10-item questionnaire (Cronbach's $\alpha = 0.74$) and a 5-item questionnaire respectively (Cronbach's $\alpha = 0.78$). Pre-testing was done on a sample of 30 victims of animal bite in a different setting who were not included in the study. The face and construct validity of the questionnaire was checked by public health experts. In the 'knowledge' domain, the total scores ranged from 0-10 and the cut off for good knowledge was taken to be 6 or more (60% of attainable total scores). In the 'practices' domain, total scores ranged from 0-5 with each correct response in each item being given a score of 1 while incorrect responses were given a score of 0. Cut off for good practices was taken to be 3 or more (60% of the attainable total scores).

DATA ANALYSIS

All statistical data analysis was done with the help of Microsoft Excel (2016) & SPSS software (IBM Corp. version 16). Continuous variables were described as mean \pm standard deviation (SD) or median with interquartile range (IQR) while categorical variables were demonstrated as numbers with percentages. Predictors of poor knowledge and poor practices were seen by a test of significance (p -value < 0.05) at a 95% confidence interval in logistic regression models.

ETHICAL ISSUES

After getting institutional ethical clearance, participants were requested to provide written informed consent before participating in the survey. They were assured that the data provided by them will be kept confidential. All other ethical principles were strictly adhered to during the conduction of the study.

RESULTS

Socio-demographic characteristics & bite profile of the study participants

Among 139 study participants, the median age was found to be 39 years (IQR = 27-49). Overall 68.8% of the participants were males while females comprised 31.2% of the participants. Among the participants 58.2% had educational level as primary or below while 60.6% of the participants belonged to Class IV or below socio-economic status (according to modified BG Prasad scale 2020).[21] Almost 70.2% of the participants opined that the bite received was from a stray animal. Dogs were the major cause (97%) of bite injuries received by the study participants. Class II exposure bites were present among 45.3% of the participants followed by Class I bites. The most common site of bite injury was on the lower limbs (65.2%) particularly in the calf region followed by the upper limb. Most of the participants (70.4%) opined that was bite injury received was non-provoking in nature.

Knowledge and practices of the study participants related to prevention of rabies

Among 139 study participants, 59.6% of the participants had good knowledge (score ≥ 6) related to the prevention of rabies compared to 40.4% of participants having poor knowledge (score < 6). All the study participants had heard of the disease while the majority (79.2%) were aware of the mode of transmission of the disease through bites, scratches or licks on abraded skin from an infected animal. 50.2% of the participants knew about the danger sites of bite like head, neck or face. Approximately 54.8% of the participants were aware of the immediate management of the wound by washing with soap and water while 67.8% were aware of the symptoms present in an animal suffering from rabies. [Table 01] Approximately 44.4% of the participants had poor practices with regards to the prevention of rabies. 54.7% of the participants did preliminary management of the wound by washing with soap and water while 15.5% of the participants did not do any preliminary cleaning of the wound. 67.3% of the participants came to the health facility within 24 hours of the bite injury compared to 14.4% of the participants who came after 48 hours. [Table 02] A significant proportion (40.2%) of the participants added some local irritants or raw materials as part of first aid management of the wound. Application of indigenous products like chilli powder (20.2%), turmeric (14.3%), oil (11.5%), lime (6.1%), herbal paste (3.2%) and cauterization of the wound (1.1%) were the methods practiced by them for treating the wound.

Table 01: Responses of the participants on the 10-item Knowledge Questionnaire related to prevention of rabies [n=139]

SI No.	Knowledge regarding	Responses	Frequency n (%)
1	Animal harbouring the disease (Dog, Cat, Bat, Monkey)	Yes	126(90.3)
		Don't Know/No	13(9.7%)
2	Route of transmission (animal bite, licking, scratches)	Yes	110(79.2%)
		Don't Know/No	29(20.8%)
3	Rabies is fatal	Yes	105(75.4%)
		Don't know	34(24.6%)
4	Dangerous sites of animal bite	Head/Neck/Face	70(50.2%)
		Others	69(49.8%)
5	Fear of water (hydrophobia) is a symptom of rabies	Yes	94(67.8%)
		No/Don't Know	45(32.2%)
6	Immediate measures need to be taken following an animal bite	Wash the area with water only	27(19.2%)
		Wash the area with soap and water	76(54.8%)

SI No.	Knowledge regarding	Responses	Frequency n (%)
		Wash the area with soap, water and the local application of antiseptics	36(26%)
7	Person to consult first after taking the immediate measures	Doctor/Hospital	91(65.3%)
		Local quacks /traditional healer	48(34.7%)
8	It is essential to take a vaccine after the preliminary management of the wound.	Yes	78(56.4%)
		No/Don't know	61(43.6%)
9	It is essential to consult at a health facility after every episode of an animal bite	Yes	36(26%)
		No/Don't know	103(74%)
10	Rabies be prevented by vaccinating dogs	Yes	56(40.2%)
		No/Don't know	83(59.8%)

Table 02: Responses of the participants on the 5-item Practices Questionnaire related to prevention of rabies [n=139]

SI No.	Knowledge regarding	Responses	Frequency n (%)
1	Preliminary wound management done after the bite injury	Washed the area with water and soap	76(54.7%)
		Washed the area with water only	41(29.8%)
		Did nothing	22(15.5%)
2	Tying/Suturing the wound done	Yes	57(41.3%)
		No	82(58.7%)
3	Traditional practices (indigenous materials/ cauterization) in wound management	Yes	56(40.2)
		No	83(59.8%)
4	Time taken to seek the medical advice	Immediately within 24 hours	94(67.3%)
		Within 24-48hrs	25(18.3%)
		After 48 hrs	20(14.4%)
5	Person they contacted first after the animal bite	Doctor/Hospital	89(64.3%)
		Local quack/ traditional healers	50(35.7%)

Predictors of poor knowledge and poor practices among the study participants

Univariate logistic regression analysis showed several predictors to be associated with the poor level of knowledge among the study participants. The multivariable logistic regression model showed that increasing age (AOR = 1.23, 95%CI=1.11-1.56), primary or below educational level (AOR=1.91, 95%CI=1.21-2.43), Class IV or below socio-economic status (AOR = 2.44, 95%CI= 1.12-2.35) and no previous history of animal bite (AOR=1.81, 95%CI=1.14-3.21) were significantly associated with poor levels of knowledge among the study participants. The model induced was of good fit (Non-significant Hosmer-Lemeshow's test, p-value>0.05), while 24-39% of the variance of the dependent variable could be explained by this multi variable model. (Cox and Snell R²=0.24 and Nagelkerke's R²=0.39) [Table 03]

Table 03: Predictors associated with poor knowledge regarding prevention of rabies among the study participants: Logistic Regression analysis [n=139]

Parameters	Total N	Poor Knowledge n (%)	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Increasing Age (in years) *			1.45 (1.12-1.78)	<0.001	1.23(1.11-1.56)	0.004
Gender						
Male	96	35(36.5%)	1(ref)		1(ref)	
Female	43	21(48.8%)	1.54 (1.2-2.17)	<0.001	1.35(0.88-2.02)	0.15
Religion						
Hindu	99	39(39.4%)	1(ref)	
Muslim	40	17(42.5%)	1.22(0.88-1.48)	0.12
Educational level						
Above Primary	58	16(27.6%)	1(ref)		1(ref)	
Primary or below	81	40(49.4%)	2.13(1.82-2.88)	<0.001	1.91(1.21-2.43)	0.002
Socio-economic status[†]						
Above Class IV	55	14(25.5%)	1(ref)		1(ref)	
Class IV or below	84	42(50%)	2.64(2.23-3.18)	<0.001	2.44(1.12-2.35)	0.025
Previous history of animal bite						
Yes	41	12(29.3%)	1(Ref)		1(Ref)	
No	98	44(44.9%)	1.62(1.25-2.28)	<0.001	1.81(1.27-3.21)	0.014

*continuous variables; OR=Odds Ratio, CI=Confidence Interval; [†]according to BG Prasad Scale 2020

The second multivariable model showed the association of various predictors with poor levels of practice among the study participants like increasing age (AOR=1.54, 95%CI=1.32-1.82), primary or below educational level (AOR=1.54, 95%CI=1.23-2.48) and Class IV or below socio-economic status (AOR=2.12, 95%CI=1.6-3.12). This model was also found to have goodness of fit (Hosmer-Lemeshow test=0.215), while 22-34% of the variance of the level of poor practices about prevention of rabies could be explained by this multi-variable model. (Cox and Snell R²=0.22 and Nagelkerke's R²=0.34) [Table 04]

Table 04: Predictors associated with poor practices regarding prevention of rabies among the study participants: Logistic Regression analysis [n=139]

Parameters	Total N	Poor Practices n (%)	Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Increasing Age (in years) *			1.78(1.42-1.98)	<0.001	1.54(1.32-1.82)	0.028
Gender						
Male	96	34(35.4%)	1(ref)		1(ref)	
Female	43	28(65.1%)	2.82 (1.62-5.88)	<0.001	1.92(0.91-4.54)	0.24
Religion						
Hindu	99	42(42.4%)	1(ref)	
Muslim	40	20(50%)	1.54(0.78-2.34)	0.35
Educational level						
Above Primary	58	18(31%)	1(ref)		1(ref)	
Primary or below	81	48(59.3%)	1.94(1.54-2.89)	<0.001	1.54(1.23-2.48)	0.004
Socio-economic status[†]						
Above Class IV	55	12(21.8%)	1(ref)		1(ref)	
Class IV or below	84	50(59.5%)	2.42(1.82-3.65)	<0.001	2.12(1.6-3.12)	0.002
Previous history of animal bite						
Yes	41	16(39%)	1(Ref)		1(Ref)	
No	98	46(46.9%)	1.21(1.1-2.62)	<0.001	1.12(0.87-2.41)	0.14

*continuous variables; OR=Odds Ratio, CI=Confidence Interval; †according to BG Prasad Scale 2020

DISCUSSION

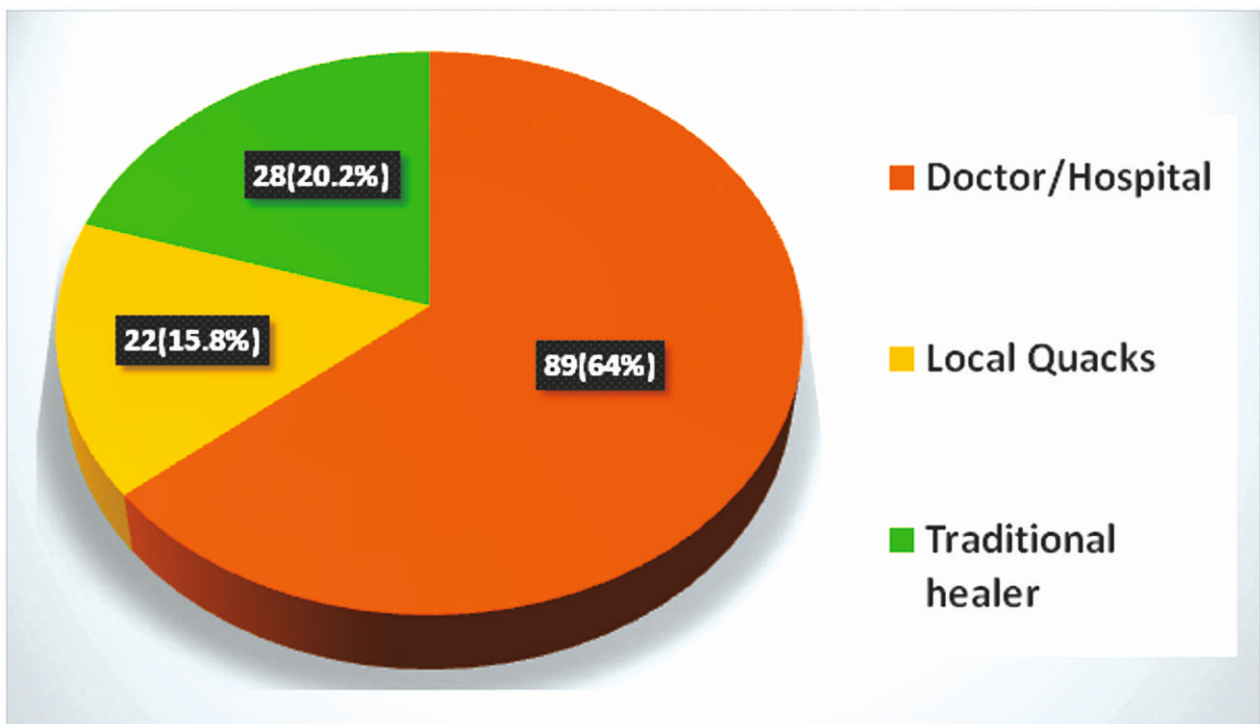
This study was conducted among victims of animal bites coming for anti-rabies vaccination at a primary healthcare facility in a rural area of West Bengal. All the participants had heard of rabies which was found similar to a study done in Tanzania where they demonstrated more than 95% of their participants to have heard of the disease.[10] Approximately 90% of the participants could correctly identify the animal harbouring the disease. A similar study conducted in Bangladesh by Rahaman et al found that more than 85% of their participants were able to correctly identify the host carrying the disease and transmitting it to humans.[12] Approximately 79.2% of the participants in the current study could correctly identify the route of transmission of the disease through bites, licks and scratches of animals infected with rabies. Similar studies conducted in Ethiopia by Digafe et al and in India by Joice et al have -demonstrated 81-86% of their study participants knew the appropriate routes of transmission of the disease from a rabid animal.[22-23] A significant proportion (75.4%) of the participants were aware that rabies was fatal. This finding was found similar to a study done in Sri Lanka by Matibag et al which showed 79% of the participants to be aware of the fatality of the disease.[24]

A previous study conducted in India by Prakash et al demonstrated that 66% of participants perceived that washing the wound with soap and water is effective as a preliminary measure for managing the wound. In the current study, a slightly less proportion (54.8%) of the participants opined that they would wash their wound with soap and water immediately after receiving the bite while only 19.2% of the participants felt that washing with water was simple enough as first aid. A significant proportion (56.4%) of the participants knew that the anti-rabies vaccine is effective in preventing the disease. This finding was found to be similar to the study conducted in India by Prakash et al which found 55% of its participants to be aware of this information.[25]

Traditional practices with regards to immediate management of the wound were found in a considerable proportion(40.2%) of the study participants. Persisting myths and false beliefs regarding the management of animal bites and, along with the dearth of institutional knowledge about rabies prevention, promote the respondent to seek these types of treatment methods. These findings were found similar to studies conducted previously in India and our neighbouring country of Bangladesh.[12,26,27]

Regarding the health-seeking behaviour of the participants, 35.7% of the participants consulted local quacks and traditional healers before coming to the primary healthcare facility. [Figure 01] But 67.3% of the participants consulted the primary health facility within 24hours which was found similar to a study conducted in Uttar Pradesh, India by Jain et al.[15]

Figure 01: Health seeking Behaviour of the study participants for immediate treatment following animal bite injury [n=139]



Some important predictors were elicited which were found to be significantly associated with the levels of knowledge and practices among the study participants. The findings showed that younger people had acceptable knowledge and practices concerning the prevention of rabies. Increasing age was found to be significantly associated with both poor levels of knowledge and practices among the study participants. These findings were found similar to studies conducted in Morocco by Bouaddi et al and in northern India, by Tiwari et al.[11,16] Educational level seemed to be significantly associated with knowledge and practices with regards to prevention of rabies among the study participants. This finding was found similar to the study conducted in Bangladesh by Rahaman et al.[12] Studies conducted by Tiwari et al in Delhi found a significant association between lower socioeconomic status with poor knowledge and practices similar to the results found in our study.[16] This study also found that participants having no previous history of dog bites having poor knowledge regarding the prevention of rabies. Participants having previous history of dog bite might have visited the health facilities for anti-rabies vaccination where they might have been counselled regarding rabies prevention. This might have led to their improved level of knowledge compared to participants who had no previous history of an animal bite.

LIMITATIONS OF THE STUDY

Since this study was conducted as a cross-sectional interview, hence the causal relationship between knowledge and practices with regards to the prevention of rabies and its predictors could not be determined. Since this study was conducted in a healthcare facility among participants who are actively coming to the health facility for seeking treatment, the level of knowledge and practices regarding rabies might seem to be better than the actual scenario prevailing in the community. Thus, selection bias might be possible.

CONCLUSION

This study clearly showed a gap in knowledge and practices about animal bites and their management among the victims of animal bites in this rural area of Noapara, Purba Bardhaman district, West Bengal. Local treatment of the wound right after a bite is an important step in the management of a case and this fact was highly lacking in the subjects. Moreover, inappropriate health-seeking behaviour, as well as the burden of myths, taboos and traditional practices emerged as a major hindrance among them for taking appropriate steps to prevent the disease. Thus, suitable steps are needed to change the current scenario. Appropriate health education by motivation and counselling, creating mass awareness campaigns in the community with regards to prevention and control of rabies can help in improving the situation to a great extent. Appropriate IEC materials following guidelines provided by the WHO translated into local language should be made available at the facility level to orient animal bite victims as well as health care providers regarding the importance of appropriate wound management and prophylaxis to prevent the disease.

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DECLARATION OF CONFLICTING INTERESTS:

The authors declare that there is no conflict of interest.

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