

Knowledge, Attitudes and Practices regarding Dog Bite Management among First year paramedical students in Etawah, Uttar Pradesh: A Cross-Sectional Study

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Citation: Arunima Sharma, Sandip Kumar, Dhiraj Kumar Srivastava, Anurag Verma, Jyoti Kumari, Prashant Barailly. A Cross-Sectional Study to Assess the Knowledge, Attitudes and Practices towards Dog-Bite among Para-Medical Students at Teaching Hospital of District Etawah, Uttar Pradesh. Indian J Comm Health. 2026;38(3): Page Number 618 - 623 <https://doi.org/10.47203/IJCH.2026.v38i03.017>

Article cycle: Received: 21/04/2026; Accepted: 20/06/2026; Published: 30/06/2026

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Abstract:

Background: Dog bites represent the predominant route of rabies transmission and constitute a critical public health concern across India. Rabies associated morbidity and mortality continue to be overlooked as a public health issue, though timely wound care and post exposure prophylaxis (PEP) are well established preventive strategies; nonetheless, persistent deficits in awareness and appropriate management behaviours remain a challenge. Paramedical, nursing, and pharmacy trainees form a significant part of the forthcoming healthcare workforce, and their preparedness plays a vital role in rabies control and management. **Objective:** To evaluate the knowledge, attitudes, and practices (KAP) concerning dog bite management among first year paramedical students enrolled at a tertiary level teaching institution in Etawah, Uttar Pradesh. **Material & Methods:** Present study is a cross sectional study carried out among eligible first year paramedical students at a tertiary care teaching hospital in Etawah. Participants were invited using a complete enumeration approach, and KAP levels were categorized as good/poor using a $\geq 50\%$ domain specific cut off score and a pre-validated semi-structured questionnaire was administered via Google Forms. The instrument captured sociodemographic data alongside KAP components related to rabies and dog bite management. Statistical analyses were performed using SPSS version 24.0. Descriptive measures were used to present the study variables, while chi-square/ Fisher's exact test evaluated associations between sociodemographic characteristics and KAP categories. A p-value below 0.05 was taken as the threshold for statistical significance. **Results:** Of the 197 participants, 47.2% exhibited adequate knowledge, 44.7% demonstrated favourable attitudes, and 41.6% reported appropriate practices pertaining to dog bite management. While the majority correctly identified rabies as an almost invariably fatal disease once clinical symptoms appear (92.9%) and recognised dog bites as the primary transmission mechanism (81.2%), only 47.7% knew that immediate wound washing with soap and water was essential, and merely 41.1% appreciated the necessity of prompt medical care following a bite. No statistically significant associations were detected between sociodemographic characteristics and KAP levels. **Conclusion:** Although general awareness of rabies and its transmission was at an acceptable level, notable deficiencies persisted in knowledge and practices concerning post exposure management. Focused educational programmes and curriculum integrated training are warranted to strengthen the preparedness of future healthcare professionals.

Key-words: Rabies; Dog Bite; Knowledge; Attitude; Practice; Paramedical Students; Post Exposure Prophylaxis

Introduction:

Rabies is a vaccine preventable zoonotic illness that continues to pose a major public health threat, particularly in low and middle income nations. Effective preventive interventions exist, yet rabies remains responsible for considerable morbidity, mortality, and economic loss worldwide. Globally, approximately 59,000 human fatalities are attributed to rabies annually, with the preponderance occurring in Asia and Africa.

India shoulders a disproportionately large share of the global rabies burden and continues to grapple with dogmediated transmission despite sustained national control efforts.[1-3]

Immediate wound cleansing, early healthcare consultation, and judicious postexposure prophylaxis (PEP) are highly efficacious in averting rabies following animal exposure. Once the virus disseminates to the central nervous system and clinical manifestations emerge, the disease is invariably fatal

in 100% of cases.[3,4] Notably, immunocompromised status and pregnancy do not constitute contraindications to rabies PEP, and exposure to the virus during pregnancy does not necessitate termination.[5] Nevertheless, investigations across South Asia have consistently identified shortfalls in awareness and healthseeking conduct related to rabies prevention. Community level studies from Nepal and Bangladesh revealed that although general awareness about rabies was reasonably high, first-aid knowledge, wound washing practices, and appropriate postexposure management remained poor.[6,7] Analogous observations have emerged from India, where research among rural and urban cohorts demonstrated inadequate knowledge and practices regarding dog bite management despite awareness of rabies as a fatal condition.[8,9]

Healthcare professionals bear a pivotal responsibility in rabies prevention through timely identification of exposures, delivery of postexposure prophylaxis, counselling of patients, and community outreach. Preexposure prophylaxis is advised for individuals at continuous, frequent, or elevated risk of exposure to rabies virus owing to their place of residence or occupational profile.[5] Nonetheless, recent evidence has documented substantial shortcomings in rabies related knowledge and management practices among healthcare workers, trainees, and community level health personnel. A multicentre investigation among healthcare professionals highlighted lacunae in rabies prevention and management knowledge, while studies among medical and allied health trainees underscored the need for structured educational interventions to improve readiness for animal bite management.[10,11]

Paramedical, nursing, and pharmacy students constitute an integral segment of the forthcoming healthcare workforce and are likely to participate in the initial assessment, counselling, and referral of animal bite cases. Early identification of KAP gaps among prospective healthcare providers is indispensable for reinforcing rabies prevention and supporting India's 2030 target of eliminating dog-mediated human rabies.[3,5] Strengthened One Health coordination, integrated human animal surveillance, enhanced public awareness, improved healthcare infrastructure, and expanded vaccine accessibility can accelerate rabies control across South-East Asia and contribute to the global 'Zero by 30' objective.5 Although KAP concerning rabies has been investigated among community populations and healthcare workers, data specifically pertaining to first year paramedical students remain scarce. The present study was therefore undertaken to assess knowledge, attitudes, and practices regarding dog bite management in this population at a tertiary care teaching hospital in Etawah, Uttar Pradesh.

Aim & Objective

To assess the knowledge, attitudes and practices regarding dog bite management among first year paramedical students at a tertiary care teaching hospital in Etawah, Uttar Pradesh.

Materials and Methods:

Study Design and Setting

A cross-sectional design was employed among first year paramedical students at a tertiary care teaching hospital in Etawah district, Uttar Pradesh, India. The study was undertaken to characterise knowledge, attitudes, and practices related to dog bite management and rabies prevention among future health care providers at the commencement of their professional training.

Study Population and Sampling

The study population comprised all first year paramedical students enrolled at the institution during the study period. Inclusion criteria encompassed students present during data collection who provided written informed consent. A complete enumeration approach was adopted, wherein all eligible first year paramedical students were invited to participate. Of 240 eligible students, 197 agreed to participate, yielding a response rate of 82.1%. Those absent on the days of data collection or who declined consent were excluded.

Study Tool and Data Collection

Data were gathered using a pre-validated semi-structured questionnaire administered via Google Forms. The instrument was developed following a comprehensive review of existing literature on rabies prevention and dog bite management, and pilot tested among a subset of students not forming part of the final sample, to ensure clarity, comprehensibility, and feasibility. Required refinements were incorporated prior to final administration.

Content validity was established by a three member expert panel comprising two public health specialists and one microbiologist with expertise in zoonotic diseases. Each item was evaluated for relevance on a 4 point scale, yielding a Content Validity Index (CVI) of 0.87. The tool was piloted among 20 students (excluded from the main study) to assess clarity, comprehension, and feasibility; minor adjustments were made based on feedback. Internal consistency across the knowledge, attitude, and practice domains was determined using Cronbach's alpha, which yielded values of 0.71, 0.68, and 0.65, respectively, reflecting acceptable reliability. Although the attitude and practice domains demonstrated moderate internal consistency, these values were considered acceptable for exploratory KAP research.

The questionnaire comprised four sections:

Sociodemographic characteristics: encompassing age, gender, and social category.

Knowledge domain consisting of 11 items evaluating awareness of rabies, modes of transmission, case fatality, wound management, postexposure prophylaxis, rabies immunoglobulin, and preventive measures.

Attitude domain comprising 6 items assessing perceptions regarding wound care, anti-rabies vaccination, observation of the biting animal, vaccination of pet dogs, and rabies prevention in general.

Practice domain consisting of 6 items capturing self reported behaviours related to dog bite management, vaccination compliance, and preventive actions.

Scoring of Knowledge, Attitude, and Practice

Across all three domains, a score of 1 was awarded for each correct response and 0 for each incorrect one. The knowledge domain encompassed 11 items (total score range: 0-11), the attitude domain included 6 items (range: 0-6), and the practice domain also comprised 6 items (range: 0-6). The aggregate KAP score therefore ranged from 0 to 23, with higher values reflecting superior awareness and preparedness across domains of dog bite management and rabies prevention. Participants attaining at least 50% of the maximum attainable score within a given domain were categorised as having adequate knowledge, favourable attitude, or satisfactory practice.

Accordingly:

As no standardised cut-off for KAP score classification exists in the rabies literature, a threshold of $\geq 50\%$ of the maximum score was used, consistent with comparable published studies and to allow meaningful comparison across the literature. A sensitivity analysis with a 60% threshold was additionally performed to verify the robustness of the results; the main conclusions were unaffected

Knowledge score >6 was designated as good knowledge; ≤ 6 as poor knowledge.

Attitude score >3 was designated as positive attitude; ≤ 3 as poor attitude.

Practice score >3 was designated as good practice; ≤ 3 as poor practice.

Statistical Analysis

Data were initially compiled in Microsoft Excel and subsequently transferred to the Statistical Package for the Social Sciences (SPSS) version 24.0 for analysis. Participant characteristics and KAP variables were summarised using descriptive statistics. Categorical data were expressed as frequencies and percentages. The chisquare test and Fisher's exact test were used to examine associations between sociodemographic variables and KAP categories, with

statistical significance defined as a p-value of less than 0.05.

Ethical Considerations

The study was conducted with prior approval from the Institutional Ethics Committee of Uttar Pradesh University of Medical Sciences (UPUMS), Saifai (Ref: 130/Cert./IEC/UPUMS/2023-24). Written informed consent was secured from all participants prior to enrolment. Participation was entirely voluntary, and participant anonymity and data confidentiality were maintained throughout the study. All data were securely stored with access restricted to the principal investigator.

Results:

Sociodemographic Characteristics

A total of 197 first year paramedical students were included in the study. Among them, 106 (53.8%) were female and 91 (46.2%) were male. Nearly half of all participants were in the 21-24 years age group (47.7%), followed by 46.2% in the 18-20 years category. Regarding social category, 97 participants (49.2%) belonged to the Other Backward Class (OBC), 51 (25.9%) to the General category, 46 (23.4%) to Scheduled Castes (SC), and 3 (1.5%) to Scheduled Tribes (ST) (Table 1).

Table 1: Sociodemographic profile of the study participants (N=197)

Sociodemographic Profile			Frequency (N=197)	
S. No.	Variables	Subgroup	Frequency (n)	Percentage (%)
1.	Gender	Male	91	46.2%
		Female	106	53.8%
2.	Age Group (in years)	18-20 years	91	46.2%
		21-24 years	94	47.7%
		25-28 years	12	6.1%
3.	Category	General	51	25.9%
		OBC	97	49.2%
		SC	46	23.4%
		ST	3	1.5%

Knowledge Regarding Rabies and Dog-Bite Management

A large proportion of participants (92.9%) correctly identified rabies as rabies as an almost invariably fatal disease once clinical symptoms appear, and the majority (81.2%) recognised dog bites as a principal route of transmission. Awareness regarding preventive measures was comparatively higher, although critical knowledge gaps in postexposure management were identified. Only 47.7% of respondents were aware that a dog bite wound must be promptly washed with soap and water, and merely 41.1% understood the need for

immediate medical consultation following a bite. Overall, 93 participants (47.2%) were classified as having good knowledge of dog bite management and rabies prevention, while 104 (52.8%) demonstrated poor knowledge, having scored below the 50% threshold (Table 2).

Attitudes Towards Rabies Prevention

Attitudes towards rabies prevention and dog bite management varied considerably among participants. Favourable attitudes were evident regarding wound cleansing, observation of the offending animal, and uptake of anti-rabies vaccination. However, misconceptions persisted around vaccination of pet dogs and appropriate response to biting animals. In aggregate, 88 participants (44.7%) demonstrated a positive attitude, while 109 (55.3%) held an unfavourable attitude towards rabies prevention (Table 2).

Practices Related to Dog-Bite Management

Practicelated responses indicated suboptimal adherence to recommended preventive behaviours. Health-seeking conduct among animal bite victims and compliance with preventive strategies such as preexposure prophylaxis was found to be limited. Consequently, 82 participants (41.6%) reported good practices, whereas 115 (58.4%) exhibited poor practices in relation to dog bite management and rabies prevention (Table 2).

Table 2: Distribution of Participants According to Knowledge, Attitude, and Practice (KAP) Levels (N = 197)

Variables	Subgroup	Frequency (N=197)	Percentage (%)
Knowledge	Good Knowledge	93	47.2
	Poor Knowledge	104	52.8
Attitude	Good Attitude	88	44.7
	Poor Attitude	109	55.3
Practice	Good Practice	82	41.6
	Poor Practice	115	58.4

As presented in Tables 3&5, no statistically significant association was found between knowledge levels and age group, gender, or social category. Similarly, attitude and practice scores did not differ significantly across any of the sociodemographi variables examined.

Table 3: Association Between Socio-Demographic Variables and Knowledge Levels Among Participants (N = 197)

S. No.	Variables	Subgroup	Good Knowledge	Poor Knowledge	Total	Test Of Significance		
						X2	df	P value
1	Age Group	18-20	36	55	91	4.765	2	.092
		21-24	52	42	94			
		25-28	5	7	12			
2	Gender	Male	46	45	91	.758	1	.384
		Female	47	59	106			
3	Category	General	25	26	51	.594	3	.920
		OBC	45	52	97			
		SC	21	25	46			
		ST	2	1	3			

*Fisher's exact test applied (expected cell count < 5 for the ST subgroup, n=3)

Table 4: Association Between Socio-Demographic Variables and Attitude Levels Among Participants (N = 197)

S. No.	Variables	Sub-group	Good Attitude	Poor Attitude	Total	Test Of Significance		
						X2	df	P Value
1	Age Group	18-20	38	53	91	.746	2	.689
		21-24	45	49	94			
		25-28	5	7	12			
2	Gender	Male	42	49	91	.151	1	.698
		Female	46	60	106			
3	Category	General	29	22	51	5.225	3	.135
		OBC	40	57	97			
		SC	17	29	46			
		ST	2	1	3			

*Fisher's exact test applied (expected cell count < 5 for the ST subgroup, n=3)

Table 5: Association Between Socio-Demographic Variables and Practice Levels Among Participants (N = 197)

S. No.	Variables	Sub-group	Good/ Correct Practices	Poor/ Incorrect Practices	Total	Test Of Significance		
						X2	df	P Value
1	Age Group	18 -20	34	57	91	2.213	2	.331
		21 -24	41	53	94			
		25 -28	7	5	12			
2	Gender	Male	39	52	91	.106	1	.745
		Female	43	63	106			
3	Category	General	25	26	51	2.523	3	.462
		OBC	37	60	97			
		SC	18	28	46			
		ST	2	1	3			

*Fisher's exact test applied (expected cell count < 5 for the ST subgroup, n=3)

Discussion:

The present investigation was conducted to assess knowledge, attitudes, and practices pertaining to dog bite management and rabies prevention among first-year paramedical students. Findings revealed moderate levels of general rabies awareness; however, substantial deficits were identified in knowledge and practices concerning post-exposure management. The proportions of participants demonstrating adequate knowledge (47.2%), favourable attitudes (44.7%), and appropriate practices (41.6%) were suboptimal, underscoring considerable room for improvement among future healthcare professionals.

The study uncovered a marked discordance between general rabies awareness and specific post-exposure management knowledge. Although 92.9% of respondents identified rabies as a fatal condition and 81.2% recognised dog bites as the primary transmission route, only 47.7% were aware of the necessity to promptly wash wounds with soap and water, and merely 41.1% acknowledged the importance of seeking immediate medical care following a bite. Community-based research from Nepal and Bangladesh has similarly documented high general awareness of rabies alongside inadequate first aid knowledge, wound care practices, and healthcare seeking behaviours.[6,7] Comparable findings have been reported from rural Bihar and eastern India, where respondents demonstrated awareness of rabies yet exhibited poor post-bite management practices and delays in accessing treatment. Collectively, these results corroborate the premise that awareness of rabies fatality alone is insufficient to translate into appropriate preventive behaviour.[8,9]

The deficiencies identified in the present study are of particular significance given that the study population comprises prospective healthcare personnel who may be engaged in the counselling, referral, and initial management of animal bite victims. Parallel knowledge gaps have been documented among practising healthcare workers. Ahmad et al. reported persistent shortcomings in post-exposure prophylaxis knowledge and rabies management protocols even among healthcare staff with a reasonable general awareness of rabies.[10] Likewise, research involving medical students and community health workers in India has consistently demonstrated that structured educational interventions are essential to reinforce adherence to standard rabies prevention protocols and strengthen practical competence.[11,12]

These findings collectively highlight the imperative of incorporating comprehensive rabies education at the outset of

professional training. Over half of the participants demonstrated poor attitudes and practices related to rabies prevention. While the disease itself was broadly recognised, misconceptions were apparent regarding vaccination practices, animal observation, and preventive strategies. Analogous concerns have been documented among healthcare workers and community populations across India and other South Asian nations.[6-10] Probable contributing factors include insufficient practical exposure, inadequate training in animal bite management, and limited curricular emphasis on rabies prevention during the early years of professional education. The low prevalence of appropriate practices highlights the need for competency-based pedagogical approaches centred on practical wound management skills, post-exposure prophylaxis protocols, and patient counselling techniques.

No statistically significant relationship was observed between KAP levels and any sociodemographic characteristic. Earlier KAP investigations have yielded similar results, demonstrating that deficits in rabies-related knowledge and practices are distributed across demographic subgroups rather than being confined to specific age, gender, or social categories.[6,9,13] This suggests that educational interventions should be universally targeted, encompassing all students irrespective of their demographic profile.

The present findings carry significant implications for rabies control in India. Despite implementation of the National Action Plan for Dog-Mediated Rabies Elimination (NAPRE), accumulating evidence continues to highlight gaps in awareness, healthcare seeking behaviour, and access to appropriate prophylaxis.[2,3,14] Enhancing rabies education among healthcare trainees has the potential to improve patient counselling quality, promote appropriate referral practices, and strengthen community-level awareness, all of which are essential for realising national rabies elimination targets. The identified gaps may be addressed through integration of structured teaching modules, practical demonstrations, simulation-based learning, and periodic refresher training on rabies prevention into undergraduate curricula.

The present study has several limitations. Although a complete enumeration approach was adopted within the institution, the single-centre nature of the study limits external validity. Additionally, practices were assessed through self-report, which may be subject to recall and social desirability bias. Nevertheless, the study provides valuable baseline evidence on KAP related to rabies among a group that constitutes a critical component of the future healthcare workforce.

Conclusion:

The present study demonstrates that while most participants recognised rabies as an acute, life-threatening disease and were aware of dog bites as a principal mode of transmission, critical gaps persisted in knowledge and practices pertaining to postexposure care. Only a minority of students demonstrated adequate knowledge, appropriate attitudes, and satisfactory practices in preventing rabies following dog bite exposure. Specific deficiencies were evident in awareness of prompt wound washing and the need for immediate medical consultation after a bite.

These findings underscore the importance of incorporating rabies related education into the early phases of professional curricula. Competency based instructional strategies, combined with regular exposure to updated management guidelines, can meaningfully enhance student preparedness in real world clinical and community settings. Future multicentric studies involving larger and more diverse student populations are recommended to generate broader insights into the educational needs associated with rabies control efforts.

Acknowledgement

The authors thank the faculty, staff, and study participants for their valuable support and cooperation during the conduct of the study.

Funding

No external funding was received for this study.

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