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A Qualitative Exploration of Perceptions, Practices, and Systemic Barriers to Rabies Post- Exposure Prophylaxis in Rural Uttarakhand, India

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Research Article

Keywords: Rabies, Qualitative research, Thematic analysis, PEP, Health behaviour, Neglected tropical diseases

Posted Date: June 26th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9509305/v1

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Additional Declarations: No competing interests reported.

Version of Record: A version of this preprint was published at Discover Public Health on November 5th, 2026. See the published version at https://doi.org/10.1186/s12982-026-03280-4.

Abstract

Background

Rabies continues to be a universally fatal yet preventable neglected tropical disease (NTD). While most studies conducted on animal bites are predominantly quantitative describing the burden of animal bites, there is limited literature that captures the socio-cultural, behavioural and systemic factors that affect response and health-seeking behaviour following exposure to animal bites and its prophylaxis especially in rural settings.

Aim

To explore perceptions, practices, and barriers related to Rabies prevention and its post-exposure prophylaxis (PEP) among animal bite victims.

Methods

A qualitative exploratory study was conducted among individuals who presented with animal bites at a rural health facility in the state of Uttarakhand, India. Purposive sampling was done in order to ascertain variations in severity of exposure, healthcare-seeking behaviour, and PEP compliance and adherence. Semi-structured interviews were conducted telephonically to collect data. Data was then analysed using Braun and Clarke's six-phase reflexive thematic analysis.

Results

Five overarching themes were identified: 1. Perceived invulnerability and normalization of animal bites, 2. Misconceptions and fragmented knowledge about Rabies, 3. Culturally embedded and inadequate wound care practices, 4. Structural and cognitive barriers to completion of PEP and 5.Informal health networks.

Conclusion

It was concluded that prevention of Rabies especially in rural settings is influenced to a great extent by complex interconnected cultural, behavioural and systemic factors. Many myths, traditional socio-cultural practices, economic constraints and infrastructural and logistic related barriers to healthcare collectively undermine the adherence to the recommended PEP schedule.

INTRODUCTION

Neglected Tropical Diseases (NTDs) are of great public health importance globally. These are infectious diseases that affect people living primarily in the subtropical and tropical regions. [1] Poverty, lack of hygiene and sanitation and limited access to healthcare are major factors which affect the occurrence of these diseases. [2] Examples of NTDs include: Dengue, Leprosy, Trachoma, Soil transmitted helminths, Rabies, etc. [3] Rabies is one such NTD which is of great global public health importance and carries near 100% fatality once clinical symptoms manifest. [4] Though effective strategies for Rabies prevention exist such as immediate wound management, anti-rabies

vaccination (ARV), and rabies immunoglobulin (RIG), yet the disease still persists as a huge and substantial burden, more often in the low and middle income countries (LMICs). [5, 6]

According to the World Health Organization (WHO), approximately 59,000 human deaths are attributed to Rabies yearly in over 150 countries. 95% of these cases occur in Asia and Africa. Due to widespread under-ascertainment and ambiguous reporting, this number can be considered a crude and gross underestimation of the actual burden of disease. Dog mediated Rabies accounts for almost 99% of Rabies cases. The burden of disease is disproportionately high among rural and socio-economically weaker populations and children less than 15 years of age. Countries like Canada, the United States of America (USA), Western Europe, Japan and a few Latin American countries have attained status of dog-mediated Rabies elimination. Countries like Australia and many Pacific island nations have always been free from dog-mediated rabies though they continue to stay susceptible and may still report cases that are imported. In order to maintain their disease free status, these countries still sustain costs for surveillance of endemic transmission in wildlife. [7]

India contributes a significant burden of Rabies related mortality globally. As per the WHO data, India is an endemic zone for Rabies and accounts for almost 36% of the global Rabies deaths. [8] WHO also states that about 30–60% of the total reported Rabies cases and deaths in India occur in children who are aged less than 15 years. This is due to the fact that bites occurring in children often go unrecognized and subsequently unreported. [8] It is noteworthy that deaths due to rabies in human are 100% preventable through prompt response, medical care that is time-appropriate and prophylaxis which needs patient compliance and adherence. [8]

Studies conducted in the past which include quantitative epidemiological studies have focussed mainly on the distribution, determinants and characteristics of animal bite cases and their management. Though these studies continue to provide important epidemiological data and are imperative for rabies prevention, they often fail to recognise the interplay of various cultural, economic, cognitive, social and systemic factors that shape the individuals response and behaviour after exposure. [9]

This is particularly important in rural settings where healthcare access is limited, affordability is low and traditional beliefs are stringent and influential. [7] Even basic care is impeded by myths and misconceptions about various aspects of Rabies like its transmission, management, and importance of prophylaxis. Reliance on indigenous and local traditional medical practices, structural barriers like that of cost and accessibility further delay optimal care. [10]

Understanding these critical gaps is crucial and thus the present study was planned as a qualitative approach in order to assess the lived experiences of individuals, their thoughts, perceptions and factors that determined their decision making following an animal bite. The study further aimed to provide a deeper understanding of behavioural and systemic determinants for designing context-specific interventions towards the control and prevention of Rabies.

MATERIALS AND METHODS

Study Setting and Design

The present study was executed in the field practice area of a rural health facility in the state of Uttarakhand, India among participants previously included in a quantitative descriptive study on animal bites by the same researchers. [11] This study was a qualitative exploratory study which was guided by a phenomenological approach. This was

done to understand the lived experiences of study participants after exposure to animal bite. While the assessment of the qualitative parameters and variables was prospective, the identification and enrolment of cases was retrospective, covering animal bite cases in the period from 1st April 2022 to 31st March 2023 at the outpatient department (OPD) of rural health facility.

Study Participants

All individuals who had reported to the facility with any form of animal bite during the study period were included. In cases where children were involved, their primary caregivers were interviewed. As the data was primarily collected over telephonic interviews, the patients who did not answer the phone after 3 attempts were excluded.

Sampling Strategy

Purposive Sampling was adopted for ensuring that there was diversity in experiences such as:

- Categories of animal bite according to National guidelines for Rabies prophylaxis, 2019, Ministry of Health and Family Welfare, (MoHFW) India. [12]
- Completion and Variation in Post-exposure Prophylaxis (PEP)
- Factors determining Health Seeking Behaviour

The sampling continued until thematic saturation was achieved. [13] An exact sample size could not be calculated based on thematic saturation because participants were interviewed based on their health seeking behaviour, wound care, schedule of ARV completed and RIG administration. As barriers were different with respect to their context and contributed to different themes, sample size could not be ascertained.

Data Collection Tool

After review of existing literature and guidelines related to animal bite, a semi-structured interview schedule/guide was developed, that covered various factors to gain in-depth knowledge about various qualitative factors affecting the perception of animal bite cases. These included:

- Perceptions regarding severity and transmission of Rabies
- Response to animal bite
- Health-seeking and care accepting behaviour
- Vaccination experience
- Various Barriers and Facilitators towards care

Study Definitions

1. Adequate Wound Care:

This was defined as follows under 3 broad headings-

- **Physical**: Washing of each wound immediately with running water for at least a duration of 15 mins.

- **Chemical**: Cleaning the wounds with soap and water and application of antiseptics.
- **Biological**: Infiltration in the depth and around the wound with RIG in cases of Category III exposures and immuno-compromised patients with Cat II bite. [14]

1. **Full schedule of ARV PEP**:

Intra-dermal Schedule

This schedule includes administration of intradermal (ID) injection in dose of 0.1 ml of reconstituted vaccine at two sites per visit (one on each deltoid area, an inch above the insertion of deltoid muscle) on days 0, 3, 7 and 28. Day 0 is considered as the date of administration of the first dose of ARV. [12]

Intramuscular schedule

This course for PEP consists of intramuscular (IM) administration of five injections, one dose each given on days 0, 3, 7, 14 and 28 of 0.5 ml. Day 0 is considered as the date of administration of the first dose of ARV. [12]

1. **Timely RIG Administration**:

RIG should be administered only once, preferably at or as soon as possible after initiation of PEP. Administration of RIG is not advised beyond the 7th day after the first dose of ARV. This is irrespective of whether the ARV doses were received on days 3 and 7 because beyond the 7th day, an active antibody response to ARV has already started, and this would lead to wastage of RIG. RIG is Administered in Category III bites as per classification in the dose of 40 IU per kg body weight for Equine Rabies Immunoglobulin (ERIG) and 20 IU per kg body weight for Human Rabies Immunoglobulin (HRIG). It is infiltrated into or as close as possible to the bite sites in its entirety or as much as anatomically possible. [12]

Data Collection Procedure

Telephonic interviews were conducted after obtaining verbal informed consent. Interviews were taken contemporaneously and then expanded subsequently into detailed narratives for analysis. The patients who were willing to visit the health facility were invited to do so and interview was then taken at the time of the visit after a written informed consent was obtained. For participants who were interviewed telephonically, written consent was signed digitally after obtaining verbal consent.

Data Analysis

Analysis of data was done using “Braun and Clarke’s six-step thematic analysis” that includes: [15]

1. Familiarization with data
2. Generation of Initial Codes
3. Development and Identification of Themes
4. Theme review and refinement
5. Naming and Defining the Theme
6. Synthesis and Report Writing

The data analysis began during the interviewing phase itself. This was done to identify repeated themes across all participant responses. These preliminary findings further motivated iterative revisions of the interview guide, to explore in depth, the themes considered most novel and significant. Once the data collection was accomplished,

transcripts or interviews were analysed using Nvivo software (Version 15, QSR International). Responses were further coded for respective themes. The codes illustrated the questions articulated in the interview guide. The data was coded by two investigators independently and reviewed these analyses simultaneously. The coding done was iterative and inductive, further allowing themes to emerge from the data. Findings were inferred in view of established models like the Health Belief Model (HBM) [16] for perceived barriers, susceptibility, benefits, severity and the Socio-Ecological Model [17] for capturing multi-level determinants (individual, interpersonal, community level).

Ensuring Trustworthiness

For ensuring trustworthiness; credibility was brought about by iterative probing and questioning during the interviews. For dependability systematic coding framework was consistently applied. Independent review and reflexive consideration of researcher bias helped in bringing about confirmability and lastly transferability was brought about by provision of detailed contextual description.

Ethical Considerations

Ethical approval

was obtained before starting the study from the Institutional Ethics Committee (IEC)-(Ref No. AIIMS/IEC/23/160). This study was performed in accordance with the ethical standards as laid in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. All participants were well-informed of the study objectives, and written and verbal informed consent was obtained after providing them detailed information about the study purpose, voluntary participation, right to withdraw, confidentiality measures, and data use. The study does not reveal direct identity of participants in any form and thus consent to publish is not applicable. As the study was not a clinical trial, there is no clinical trial number applicable.

RESULTS

Participants’ characteristics

During the study period, data from 63 individuals who had presented with any animal bite was collected. The socio-demographic distribution showed that majority (66.7%) of the study participants were males. As for the age distribution majority (52.4%) participants were aged between 19–60 years. Being a rural setting, 96.8% of the study participants belonged to rural areas while 3.2% were from urban areas. Category III bites were most common (58.8%). Washing the wound with soap and water was reported by 57.1% of the victims though it was reported to be done for a short duration of time and not for the recommended 15 minutes. 23.8% did nothing post animal bite, while 14.3% washed the wound with antiseptics. Wrong practices like applying chilli powder and Vicks were practiced by 4.8% of individuals. It was found that 76.2% of the participants had completed full schedule of ARV while 22.2% had dropped out in between. Among all those who had category III bites, only 21.6% received RIG. [11]

Five major themes that emerged from the qualitative analysis are explained as follows:

Theme 1: Perceived Invulnerability and Normalization of Animal Bites

Animal bites were considered frequently as routine regular events as close human-animal interaction was common in the rural area. Moreover participants usually underestimated the gravity of the exposure in cases where the animal was known, a pet or appeared rather healthy.

Participant: " *Hamara apna paltu kutta tha. Mujhe nahi lagta tha ki kuch serious ho sakta hai."*

English Translation

"As it was our pet dog, I didn't think anything serious would happen."

Participant: " *Gaon mein. aise chota mota to jaanwar kaatta rehta hai. Hume nahi lagta ki ismein darne wali koi baat hai."*

English Translation

"In the villages, such small animal bites keep occurring. We don't consider them dangerous and are not even scared of them."

This normalization was a major factor for delay in obtaining healthcare or inadequate healthcare-seeking behaviour.

Theme 2: Misconceptions and Fragmented Knowledge and About Rabies

It was identified that there was total/partial lack of knowledge regarding rabies among the study participants. Among people who had some awareness, it was often limited only to extreme manifestations like aggressive animal behaviour. Concept of asymptomatic transmission remained poorly understood.

Participant

Humne to suna hai ki Rabies tabhi hota hai jab kutta pgal ho jata hai ya uske muh se jhaag aa raha hota hai.

English Translation

By what we have heard, Rabies only happens when the dog is mad or is foaming at the mouth.

Participant

Agar jaanwar bilkul swasth hai, normal hai to fir injections ki koi jarurat nahi hoti.

English Translation

"If the animal is healthy and normal, then there is no need for any injections."

Participant

Hamare Dadaji ko to itni baar kata hai kutte ne, unhe to kabhi kuch nahi hua.

English Translation

Our grandfather was bitten by a dog many times and nothing happened to him.

Such misconceptions and lack of knowledge leads to reduced perceived susceptibility. Decision making is thus influenced substantially regarding PEP.

Theme 3: Culturally Embedded and Inadequate Wound Care Practices

Physical wound management remains the foremost step for management of animal bite. Washing the wound with soap and water has proven to reduce the risk of contracting Rabies by 30%. [18] In this study Initial wound management was frequently guided and affected by various cultural and traditional practices. It was based more on informal advice from friends and family rather than evidence-based recommendations.

Participant

Maa ne kaha tha mirchi aur tel mila ke laga lo. Theek ho jayega.

English Translation

"I applied chilli powder and oil first; my mother suggested it. She said it will heal"

Participant

Bade budhe bolte they mirchi laga lo. Wahi hum bhi laga lete hai. Kabhi kabhi vicks bhi laga lete hai.

English Translation

"Our elders have suggested to apply chilli powder on bite sites. We apply that only. Sometimes we apply vicks also"

Participant

Maine to bus jaldi se pani se dho liya. Bus kafi tha.

English Translation

"I had washed it quickly with water. I feel that is enough."

It was reported that many inappropriate practices were followed, including application of household substances like chilli powder, Vicks etc. Proper wound washing for the recommended duration was notably absent as those who washed did not wash for recommended time of 15 minutes or did not use soap.

Theme 4: Structural and Cognitive Barriers to Completion of PEP

Adherence to vaccination schedule, provision of RIG, accessibility and affordability were various interrelated barriers that affected PEP:

Accessibility Constraints

Due to unavailability of RIG at the health centre, participants were referred to higher centres. Geographical conditions and affordability became a barrier in accessing higher-level facilities where RIG was available.

Participant

Inhone kaha ek injection yaha lag jayega. But ek aur lagega to uske liye dusre aspatal jana hoga. Wo itna door tha ki hum jaa nahi paye.

English Translation

"They informed us that they can give one injection here but there is one more required. For that they told us to go to another hospital; it was far so we dint go."

Financial Limitations

Most of the patients who took PEP did not have any challenges to get ARV from the centre. But RIG was not available and therefore patients were referred to higher centres. This increased the out-of-pocket expenditure (OOPE). For those who thought they could buy it themselves and take it, found it unaffordable due to its high retail price. Thus cost considerations influenced decision-making, particularly with respect to RIG.

Participant

Ek sui to yaha lag gayi. Ek doctor sahab ne bola dusre aspatal mein lagwani padegi. Waha jane mein bahut dikkat hoti to chemist se pucha tha. Usne bola 7000 – 1000 tak lagenge. Isliye humne nahi lagwaya.

English Translation

"I received one injection here. Doctor advised me to take another which was available in some other hospital. That hospital was hard to reach for me so I asked a local chemist. He told me that the injection will cost minimum 7000–10000 rupees so I dint get it administered"

Cognitive Factors

There were some patients who did not complete the ARV schedule and left it midway. The main factor here was perceived recovery after initial few doses that led to discontinuation of further treatment. They also felt that as nothing had happened after a week or 10 days, they were safe and no further injections were warranted. Some patients also said that they did not have time to report to the facility 4 or 5 times as they did not get so many holidays from work.

Participant

Do injection lagwane ke baad laga ki tabiyat theek hi hai and ab to kya hi hoga.

English Translation

"After receiving 2 injections, I felt absolutely fine and also felt that now nothing will happen, so I did not come again."

Participant

Doctor Sahab, kaam se itni chutti thodi milti hai. 2 lagwa to liye they injection. Tetanus bhi lagwa liya tha isliye jarurat nahi lagi.

English Translation

Doctor, we do not get so many leaves from work. I had got 2 doses administered. Had also received tetanus shot, that's why I did not find it necessary to get further doses.

These findings highlight barriers that are a combination of system-level and perception-driven barriers.

Theme 5: Dependence on Informal Health Information Networks

It was observed that decision-making regarding health seeking was influenced strongly by non-medical sources, including family members, relatives, neighbours, and previous experiences.

Participant

Humne to wahi kiya jo sabhi gaon ke log karte hai

English Translation

"We only did what the other villagers usually do."

Participant

Hamare gharwalo ne kaha ki kuch bhi aise ghabarane ka nahi hai to isliye hum ruk gaye and fir ab laga ki dikha lete hai.

English Translation

"Our family and relatives said that there is nothing to feel scared so we waited and now felt that we could consult"

This suggested that healthcare providers were often consulted only after initial home-based interventions. This indicates delayed engagement with formal healthcare systems.

Table 1
Thematic Framework: Theoretical Coding Matrix Linking Themes to Behavioural Constructs

Broad Theme	Subtheme	Code	Insight from Participant	Construct for HBM	Socio-ecological Model
Theme 1: Perceived Invulnerability and Normalization of Animal Bites	Familiarity with the animal/Healthy Animal reduces risk	"Pet Dog/Healthy Dog = Safe"	Bites from known and healthy animals are harmless	Perceived Susceptibility reduced	Individual/ Interpersonal Level
	Acceptance of Routine Exposure	"Bites are routinely common in the area"	There is normalization of risk because of frequent exposure	Perceived Severity reduced	Community level
Theme 2: Misconceptions and Fragmented Knowledge and About Rabies	Understanding of Rabies which is Symptom Based	"Only Mad dog bites cause rabies"	Only Bites from Mad Dogs/ Or those frothing at mouth cause Rabies. Risk is linked to sick animal only.	Perceived Susceptibility reduced	Individual Level
	Partial Awareness with no evidence based knowledge	"Unsure about requirement of Vaccines, Previous uneventful exposure in family"	Knowledge gaps regarding requirement of PEP.	Perceived Benefit reduced	Individual Level
Theme 3: Culturally Embedded and Inadequate Wound Care Practices	Utilisation of Traditional Remedies	"Applied chilli powder/oil"	Dominance of traditional practices	Perceived benefits in traditional medicine increased	Community Level
	Inadequate physical/chemical wound care	"Immediate washing is enough"	Knowledge gap in correct practice	Self-efficacy decreased	Individual Level
	Cultural Influence of elderly	"Elders suggested application of chilli/Vicks"	Socio-cultural dominance	Perceived Benefit in elderly advice increased	Interpersonal Level
Theme 4: Structural and Cognitive Barriers to Completion of PEP	Accessibility constraints	"Higher centre far off"	Compliance affected by referral burden	Perceived Barrier Increased	System Level
	Financial burden	"Expensive injection, No leave from work"	Cost of RIG not affordable, Loss of wages	Perceived Barrier Increased	System Level
	Premature discontinuation	"Stopped after feeling better, Dint feel need"	Misinterpretation of health status, requirement of	Perceived severity reduced, Perceived	Individual Level

Broad Theme	Subtheme	Code	Insight from Participant	Construct for HBM	Socio-ecological Model
			schedule completion	Susceptibility reduced	
Theme 5: Informal Health Networks	Reliance on community advice	"Followed what other villagers said"	Influence of others behaviour	Cues to action (Informal/Social)	Interpersonal/ Community Level
	Delayed formal consultation	"Reported late to health centre"	Healthcare and consultation secondary	Formal cues to action but weak	System Level

Table 1 depicts how the patients answers/narratives and also their behaviour is not by chance or random. It is influenced at multiple levels with key identifiable constructs. Beginning at the individual level, belief that healthy looking dogs/pet dogs are safe which leads to delay in healthcare seeking and underestimation of risk of contracting Rabies. This causes reduced perceived susceptibility and severity. There was lack of knowledge specially regarding symptomatology of Rabies which leads to risk misclassification and consequently reduces perceived benefits of PEP. Various interpersonal factors and cultural practices like use of traditional remedies, elders advice act as competing belief system. They increase perceived benefits of non-medical/recommended care and lowers self-efficacy for appropriate physical and chemical wound management. Systemic/Structural factors such as high cost of RIG, wage-loss, referred facility far off emerged as perceived barriers affecting the discontinuation of PEP. Informal social networks act as major cues to action, often superseding formal and adequate healthcare advice and contributing to delayed/inappropriate responses. Holistically, the thematic matrix elucidates that behaviour towards the prevention of Rabies is governed by evolving and dynamic interaction of cognitive perceptions (HBM constructs). Holistically the matrix highlights that Rabies preventive behaviour is shaped by a dynamic interaction of cognitive perceptions (HBM constructs) mediating across multiple socio-ecological levels. Thus non-adherence to management protocols and PEP is not just determined by lack of knowledge, but it is a result of interwoven cultural, behavioural, and systemic factors.

DISCUSSION

The present study being a qualitative exploratory study provides critical insights into the perceptions, patterns, behaviour and systemic determinants that influence the practices regarding the prevention of Rabies in rural settings. The following is a discussion of our study findings with existing literature to see the generalizability of these study findings.

A major finding from our research was the participants perceived invulnerability in context of pet exposures specially and the normalization of animal bites in their settings. This factor may explain the delayed health seeking nature of the animal bite victims. This reflects low perceived susceptibility, a core construct of the Health Belief Model, and may explain delayed care-seeking behaviour. In a study by **Saleem S et al**, [19] victims in Srinagar, Kashmir, India, never had the perception that they could be bitten by street dogs. They also felt that such exposures were unpredictable and unpreventable. They mentioned that no personal strategies would work to prevent such incidents. This finding aligns with our present finding of perceived low susceptibility leading to delayed health care. In another similar study by **Penjor K et al**, [20] in south Bhutan, which is also a rabies endemic region, many animal bite victims perceived minimal or no risk at all from pet/vaccinated dogs. This leads to normalization of these bites

as non-serious specially if the animal appeared healthy. This had actually resulted in 8% of victims not seeking post-exposure prophylaxis (PEP) promptly.

The second major factor recognized were myths/misconceptions regarding various aspects of Rabies that contributed to inadequate practices. There was lack of knowledge regarding the need of PEP and also participants usually linked the association of Rabies with a visibly not normal or ill dog. They overlooked the risk of transmission from healthy animals. This finding aligns with existing evidence highlighting gaps at the community level such as in an article by **Rohde R et al**, [21] on the myths regarding rabies where they have mentioned that many people believe that transmission of rabies requires symptoms like frothing at mouth, of the biting animal, for transmission. They ignore healthy animal saliva risks. They further said that this myth persists more often in endemic areas and reduces uptake of PEP. In another study by **Priya G et al**, [22] from Tamil Nadu India, 68% of respondents thought only stray/rabid dogs transmit rabies, overlooking pet risks and delaying care. In a similar qualitative study by **Dhiman A et al**, [23] patients came late for consultation in case where the bites were small or if they were bitten by pet dogs. Patients usually came early in case they were bitten by the rabid dogs which they described as “Running here and there and with saliva drooling and biting without provocation.”

Further in the present study it was found that cultural practices played a key role in decision making in wound care behaviour. Application of chilli powder, turmeric and other such home remedies need to be addressed as the persistence of these traditional remedies affect and delay adequate post exposure care. This also highlights for health education and awareness programmes which are designed in a culture sensitive manner in order to address entrenched beliefs. In a study by **Maiti A et al**, [24] animal bite victims in central India commonly applied turmeric paste, chilli paste and quick-lime to bite sites, reflecting various sociocultural myths that impede washing with soap and water, that had led to improper management in 98.25% of cases.

Another theme identified were the barriers in completion of PEP. There were multiple factors including both cognitive and structural limitations. Limited accessibility and affordability for RIG were aggravated and showed a compounding effect by lack of knowledge and understanding the importance of completing PEP. Dependence on informal networks for information like relatives, fellow villagers, neighbours highlight gaps in effective health education and communication. Therefore strengthening the primary healthcare engagement and leveraging community based platforms could help in bridging this gap. **Dhiman A et al** [23] in their research mentioned that the distance of the health care facility from the house of the victim was a notable factor leading to delay in treatment as accessibility was difficult.

In another study by **Castillo- Neyra et al**, [25] though participants knew what to do in case of a dog bite, most of them still reported taking no action themselves. They even said that they dint know anyone who had sought any care post bite. Common reasons cited for this were lack of awareness that even small bites requires care, lack of infrastructure or poor care at health centres, economic constraints, use of traditional or alternative treatments and perception that a “known” or “good” dog is “safe”. These findings were very similar to our identified themes. Overall, our study findings emphasize that prevention of rabies not only requires interventions at the biomedical level but also targeted behavioural change communication and systemic strategies.

LIMITATIONS

No study is without certain limitations and so was the case in our study. Firstly, data collection was mostly done by telephonic interviews which were limited to non-verbal contextual cues even when a few interviews were also conducted in person. Secondly, as the data collection regarding the exposure to bite was secondary, there are

chances of potential recall bias. Lastly though the themes were very relatable, the findings may not be generalizable beyond similar rural settings.

CONCLUSION

In conclusion, it can be stated that prevention of Rabies especially in rural settings is influenced to a great extent by complex interconnected cultural, behavioural and systemic factors. They act as barriers to adequate healthcare at individual, interpersonal and community level. Many myths, traditional socio-cultural practices, economic constraints and infrastructural and logistic related barriers to healthcare collectively undermine the adherence to the recommended PEP schedule. These challenges can be only addressed by integrated interventions that focus on community awareness, behaviour change communication and health system strengthening.

RECOMMENDATIONS

Certain recommendations can be made based on the findings of this study such as ensuring decentralised availability of RIG as it is very expensive and unaffordable for most people. Strengthening community based health education and awareness programs should be imperative. Moreover, local leaders and those who have great influence on the residents can be motivated and utilized for behavioural change communication. Lastly it is very important in the context of Indian healthcare to align the interventions with the National Rabies Elimination Strategies.

Declarations

CLINICAL TRIAL NUMBER

Not applicable.

Ethical Approval:

Ethical approval was obtained before starting the study from the Institutional Ethics Committee (IEC)-(Ref No. AIIMS/IEC/23/160). This study was performed in accordance with the ethical standards as laid in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Consent to Participate:

All participants were well-informed of the study objectives, and written and verbal informed consent was obtained after providing them detailed information about the study purpose, voluntary participation, right to withdraw, confidentiality measures, and data use.

Consent to Publish:

Not applicable

Clinical trial Number

As the study was not a clinical trial, there is no clinical trial number applicable.

Conflict of Interest:

None

FUNDING STATEMENT

There was no funding received for the study.

Author Contribution

P.S. and R.K. wrote the main manuscript and were also involved in analysisA.S. did the data collection and prepared the narratives. Also helped with the protocol preparation.V.S. supervised the entire research and provided valuable inputs at every stage.

Acknowledgement

We extend our gratitude to the participants of the study whose insight helped us to draw conclusions and recommendations.

Data Availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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