"Awareness, Perceptions, and Community Engagement in Rabies Control Strategies"

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Abstract— **Rabies remains one of the most fatal yet preventable zoonotic diseases, with India contributing nearly 36% of global rabies deaths annually. Despite the availability of effective vaccines, low awareness and limited knowledge about life-saving interventions continue to hinder rabies control. This study assessed rabies awareness among 120 school students (Grades 7 and 10) in Navi Mumbai, employing surveys, group discussions, and awareness drives to evaluate knowledge, misconceptions, and community engagement potential.**

The results showed that while 75% of students were aware of rabies as a viral disease transmitted through dog bites, 25% lacked basic knowledge. Most students understood saliva-based transmission but had limited knowledge of symptoms and vaccination protocols. Alarmingly, none of the participants had heard of Post-Exposure Prophylaxis (PEP), a critical treatment after exposure. First aid knowledge was partial, focusing on wound washing but without clarity on urgency and thoroughness. Students also perceived stray dogs and limited vaccination coverage as key community-level risks. Encouragingly, nearly half expressed willingness to volunteer in rabies awareness and vaccination initiatives.

The findings reveal moderate awareness with significant gaps in essential knowledge, particularly regarding PEP and first aid practices. However, students' risk perception and readiness to engage highlight opportunities for integrating school-based education and community participation into rabies management strategies. Strengthening awareness programs that emphasize preventive vaccination, immediate post-exposure care, and youth involvement can contribute significantly to reducing rabies burden in endemic regions.

Index Terms— **Rabies, Awareness, Post-Exposure Prophylaxis (PEP), First Aid, School Students, Community Engagement, Navi Mumbai, Zoonotic Disease, Vaccination.**

I. INTRODUCTION:

Rabies is a zoonotic viral disease that affects the central nervous system of mammals, including humans. It is present in more than 150 countries and territories and can be prevented through vaccination. Dogs are responsible for nearly 99% of human rabies cases worldwide, with transmission occurring mainly through bites or scratches from infected animal's[I] . Once clinical symptoms appear, rabies is almost universally fatal, making prevention through vaccination and timely treatment after exposure critically important.

Globally, the World Health Organization estimates that more than 55,000 people die from rabies each year, with the majority of cases reported in Asia and Africa. Low awareness about the importance of seeking immediate medical care after a dog bite remains one of the leading causes of preventable deaths. India is considered rabies-endemic, contributing nearly 36% of global rabies deaths, with an estimated 18,000–20,000 deaths annually [II]. Recent reports indicate an alarming rise in rabies deaths in India, increasing from 22 in 2022 to 180 in 2024, even as presumptive cases dropped to 1,079 during the same period (Ministry of Animal Husbandry, 2025).

Children under the age of 15 are particularly vulnerable, accounting for 30–60% of cases and deaths, as dog bites in children are often unnoticed or not reported. Despite the availability of effective vaccines for both humans and animals, challenges in rabies control persist due to poor awareness, myths, and limited access to preventive healthcare services.

Awareness plays a pivotal role in empowering communities to recognize risks, vaccinate pets, and seek immediate treatment after exposure. Schools serve as crucial platforms for instilling knowledge about rabies in children, who can act as agents of change in their families and neighborhoods. Against this backdrop, the present study focuses on assessing the awareness of rabies among school students in Navi Mumbai, with a particular emphasis on community engagement initiatives as a strategy for rabies prevention and control.

II. OBJECTIVES

The present study was designed with the following objectives:

1. To assess the knowledge and awareness of rabies among 7th- and 10th-grade students.
2. To identify misconceptions and knowledge gaps related to rabies transmission, symptoms, prevention, and treatment.
3. To promote awareness about vaccination, responsible pet ownership, and post-bite care.
4. To encourage community involvement, with special emphasis on youth participation, in rabies management efforts.

III. METHODOLOGY

3.1 Study Area and Participants: The study was conducted among 120 students from local schools and tuition classes in Navi Mumbai, focusing on Grades 7 and 10. These students represented an early adolescent age group, capable of both absorbing new knowledge and influencing family members and peers through their learning.

3.2. Research Design: A mixed-methods approach was adopted to obtain both quantitative and qualitative insights:

3.3. Survey: A structured questionnaire consisting of multiple-choice questions was used to assess knowledge of rabies transmission, symptoms, vaccination, and post-bite response.

3.4. Discussions: Informal group discussions were conducted to capture student perceptions, attitudes, and misconceptions about rabies.

3.5. Awareness Drive: Information sessions were held to address knowledge gaps and provide accurate, practical guidance for rabies prevention and control.

3.6. Data Collection: Data were collected in a classroom setting with the cooperation of teachers, who assisted in facilitating the survey and ensuring clarity of questions. Students completed the questionnaire individually, and responses were analyzed quantitatively to assess levels of awareness. Notes from group discussions were thematically analyzed to extract qualitative insights, while the awareness sessions served both as an intervention and an evaluation of community engagement impact.

IV. OBSERVATIONS:

4.1. General Awareness: The survey showed that a majority of students (75%) were aware that rabies is a viral disease primarily transmitted through dog bites. However, a significant minority (25%) had no prior knowledge, indicating gaps in basic awareness about the disease.

4.2. Transmission Knowledge: Most students correctly recognized that rabies spreads through saliva from infected animals such as dogs, bats, and foxes. This shows a moderate understanding of how the disease is transmitted, although some details might still be unclear.

4.3. Symptoms: While students associated rabies with aggression and unusual behavior in animals, they were largely unsure about specific clinical signs. This reflects limited knowledge about recognizing early symptoms in both animals and humans.

4.3. Vaccination Awareness: A few students knew that dogs require vaccination against rabies, but most were unaware of vaccination schedules or the availability of vaccines for humans. This highlights a need for better education on preventive measures.

4.4. PEP Awareness: None of the students had heard of Post-Exposure Prophylaxis (PEP), which is a critical, life-saving treatment after exposure to rabies. This indicates a major knowledge gap in essential medical interventions.

4.5. First Aid Knowledge: Students commonly mentioned washing wounds with soap and water and seeking medical attention, but they lacked understanding of the urgency and the correct procedure for effective first aid.

4.6. Community Risk Perception: Students perceived rabies as a significant risk in their community, mainly due to the presence of stray dogs and limited vaccination campaigns, showing awareness of environmental and public health factors.

4.7. Willingness to Volunteer: Approximately half of the students expressed readiness to participate in rabies awareness programs and vaccination drives, suggesting positive engagement potential for community-based initiatives.

V. DISCUSSION

The survey indicated that 75% of students were aware that rabies is a viral disease primarily transmitted through dog bites, while 25% lacked this fundamental knowledge. This highlights a substantial gap in basic awareness, as understanding the cause and primary mode of transmission is crucial for prevention. Globally, rabies remains a serious public health challenge, especially in regions with high dog populations and limited healthcare access. For instance, in China, the overall awareness rate of rabies-related knowledge among rural residents was only 57.9%, despite an annual dog-bite injury exposure rate of 7.2%; moreover, 14.8% of bite victims did not seek post-exposure prophylaxis (PEP). Similarly, in Ethiopia, only 24.2% of respondents demonstrated good knowledge of PEP, even though 68.5% had favorable attitudes toward vaccination [III]. These comparisons emphasize that the gaps observed among students in this study are consistent with global trends in rabies awareness, underscoring the need for targeted education.

Most students correctly recognized that rabies is transmitted through the saliva of infected animals, including dogs, bats, and foxes. This demonstrates a moderate understanding of transmission routes. Rabies virus primarily spreads through bites, when saliva containing the virus enters broken skin or mucous membranes; less commonly, it spreads through scratches, licks on open wounds, or—very rarely—via organ transplantation or laboratory exposure [I]. Students' ability to identify wildlife reservoirs such as bats and foxes is noteworthy, as these species are important vectors in the Americas and Europe[IV]. However, gaps remain in awareness of non-bite exposures, such as mucosal contamination, and in understanding the importance of immediate first aid. Studies in Bhutan

and Bangladesh similarly revealed that while dog bites were widely recognized, knowledge of alternative transmission routes was limited [V.VI].

A critical finding was that none of the students had heard of PEP, the most essential life-saving intervention after exposure to rabies. This gap is alarming because rabies, although almost universally fatal once clinical symptoms appear, is entirely preventable through timely PEP [I]. Immediate wound washing, followed by rabies vaccination and immunoglobulin when indicated, can effectively prevent disease onset. However, lack of awareness of PEP has been reported across rabies-endemic countries. In Bangladesh, many bite victims either failed to complete or were unaware of the vaccination course [VI]. In Ethiopia, only 24.2% of respondents had good knowledge of PEP despite rabies being a major health threat [III]. The absence of PEP awareness among students in Navi Mumbai therefore mirrors a broader global problem and highlights the urgency of integrating PEP education into school-based health programs.

Students frequently mentioned washing bite wounds with soap and water and the importance of seeking medical attention. This reflects partial knowledge aligned with WHO guidelines, which emphasize immediate and thorough wound washing with running water and soap for at least 15 minutes as a critical step in rabies prevention [I]. However, students lacked clarity about the urgency and correct procedure, which could compromise effectiveness. A similar lack of detailed knowledge was found in Nepal, where only 47.7% of respondents reported proper wound-washing practices [VII]. This suggests that while first aid awareness exists, reinforcement and detailed instruction are necessary.

Students perceived rabies as a significant community risk, attributing it primarily to the high number of stray dogs and limited vaccination campaigns. This perception reflects the epidemiological reality in India, which contributes nearly 36% of global rabies deaths annually [VIII]. Comparable findings have been reported in Bangladesh and Ethiopia, where communities with high stray dog populations identified rabies as a major health threat [III, VI] . Such perceptions indicate that students are not only aware of individual-level risks but also recognize broader public health challenges linked to ecological and infrastructural factors.

Encouragingly, about half of the students expressed willingness to participate in rabies awareness campaigns and vaccination drives. This reflects a positive attitude toward community engagement and indicates the potential to involve youth in grassroots rabies prevention strategies. Evidence from Bhutan demonstrates that student participation in awareness programs can significantly improve community knowledge and vaccination uptake [VIII]. Mobilizing students as peer educators and advocates could therefore play a pivotal role in sustaining rabies awareness and prevention efforts.

VI. CONCLUSION:

The survey conducted among 120 students from Navi Mumbai revealed varied levels of awareness and preparedness regarding rabies. A majority (75%) recognized rabies as a viral disease transmitted through dog bites, while 25% had no prior knowledge, indicating a considerable awareness gap. Most students were able to identify saliva of infected animals such as dogs, bats, and foxes as sources of transmission, showing a moderate understanding of disease pathways. However, knowledge about clinical symptoms was limited, with students mainly associating rabies with aggression in animals rather than specific neurological signs in humans.

Awareness of vaccination as a preventive measure was low, with only a few students mentioning the need for animal vaccination and almost none being aware of human vaccination protocols. Strikingly, none of the students had prior knowledge of Post-Exposure Prophylaxis (PEP), underscoring a major gap in awareness of life-saving interventions.

First aid practices showed partial understanding: while many students mentioned wound washing and medical consultation, details on urgency, duration, and thoroughness of wound care were lacking. In terms of community-level risk perception, students highlighted the role of stray dog populations and insufficient vaccination drives, reflecting their awareness of public health dimensions of rabies.

Finally, approximately half of the students expressed readiness to participate in awareness drives and vaccination campaigns, indicating strong potential for youth-led community engagement in rabies prevention

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