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Original Research Article

Knowledge and Awareness About Recent Guidelines of Rabies Prophylaxis Among Health Care Professionals

Mahendran Murugavel[1], A. Indra[2], J.E. Jeffin Shanu[3], Mohamed Aarif[4], Hariharan Suresh[5], Bharathi P.[6], S. Suganya[7]

[1]Assistant Professor, Department of Microbiology, Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamil Nadu, India
[2]Assistant Professor, Department of Pharmacology, Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamil Nadu, India
[3]Associate Professor, Department of Community Medicine, Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamil Nadu, India
[4]Assistant Professor, Department of Community Medicine, Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamil Nadu, India
[5]Associate Professor, Department of Community Medicine, Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamil Nadu, India
[6]Tutor (Biostatistics), Department of Community Medicine, Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamil Nadu, India
[7]Assistant Professor, Department of Statistics, PSG College of Arts & Sciences, Coimbatore, Tamil Nadu, India

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Corresponding Author: Dr. Hariharan Suresh
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Abstract

Context: Rabies is a fatal disease which can be prevented before or after exposure to the virus. Prophylaxis of rabies at the correct time is considered to be very effective in preventing rabies from occurring. National guideline on rabies prophylaxis was revised on 2019 after WHO's revision of rabies prophylaxis. All health professionals must be aware of rabies prophylaxis so that early initiation of rabies prophylaxis is done thereby preventing rabies in the community.

Aims: To evaluate the knowledge about recent guidelines of Rabies management among health care professionals.

Methods and Material: A cross sectional study was conducted among healthcare professionals was conducted over a period of 3 months from 350 health professionals. Data was collected using google forms which included information on Sociodemographic characteristics, Knowledge about rabies and knowledge and practice on post exposure prophylaxis.

Statistical Analysis Used: Data was analyzed using SPSS software. Categorical data was presented in frequency and percentages. Chi square was used to find the association between variables.

Results: Among the study participants majority were CRMIs (34.29%), followed by doctors (31.43%), postgraduates (24.29%) and Others (10%). Of the study participants 62% of them had good knowledge, 30% of the study participants had average knowledge and 8% of the study participants had poor knowledge on recent guidelines of rabies prophylaxis.

Conclusions: The study reveals the need for more orientation programme and continuing medical education programme to healthcare professionals to create awareness about the recent guidelines on anti-rabies prophylaxis which was revised on 2019.

Keywords: Rabies, Post Exposure Prophylaxis, Knowledge, Health Professionals.

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Introduction

Rabies is an ancient disease caused by Lyssavirus. The name rabies is derived from Greek word Lyssa which means spirit of madness, rage and frenzy denoting the horror of rabid death. Every year there have been a reported 59,000 deaths worldwide due to rabies. It is spread through the bite or scratch of the infected animal. For most of the cases dogs are responsible for spreading the disease. Rabies a

neglected tropical disease occurs mostly in Africa and Asia. Approximately 80% of rabies cases were seen in rural areas while 40% of death is seen in children whose age are under 15 years. While rabies is a neglected disease investing in rabies provides a greater impact as most of the people affected by rabies are underserved population. By spending on rabies the most underserved population are also being served. A campaign was launched on February 2025 with a goal of zero rabies deaths by 2030 all over the world by the World Health Organization (WHO) along with the Food and Agriculture Organization of the United Nations (FAO), the World Organization for Animal Health (OIE) and the Global Alliance for Rabies Control (GARC) and the same was aligned with Sustainable Development Goal target [1]

Rabies is a fatal disease which can be prevented before or after exposure to the virus. The composition or use of rabies vaccine must be acceptable by the World Health Organization guidelines for immunogenicity and safety. The first live attenuated vaccine which is a nerve tissue vaccine for rabies was discovered by Louis Pasteur and Emile Roux, and it was first tested in 1885. But since 1984 nerve tissue vaccine was discontinued and it was replaced by modern, concentrated, purified cell culture and embryonated egg-based rabies vaccines. There is a need for improved thermostability, shelf life and decreased packaging volume to make it easier to deliver at community level [2]. It is estimated by WHO that yearly there are 59000 deaths due to rabies and 95% of the cases are being reported in Africa and Asia. Around 99% of the rabies cases are due to dog bite and most of the cases are children below 15 years.

Many countries like Australia, Canada, Unites States of America, Japan have eliminated dog mediated Rabies. But in Asia it is estimated that there have been 35172 deaths of humans due to rabies. The cost of postexposure prophylaxis has been found to be high in Asia [3]. India accounts for 59.9% of human deaths due to rabies in Asia and 35% around the world. In India since rabies is found to be endemic every dog bite is considered to be potential rabies exposure. The National Centre for Disease Control in India along with WHO has implemented guidelines for both pre and post exposure prophylaxis [4]. Prophylaxis of rabies at the correct time is considered to be very effective in preventing rabies from occurring. National guideline on rabies prophylaxis was revised on 2019 after WHO's revision of rabies prophylaxis. All health professionals must be aware of rabies prophylaxis so that early initiation of rabies prophylaxis is done thereby preventing rabies in the community. Hence this study was done to evaluate knowledge about recent guidelines of Rabies management among health care professionals

Subjects and Methods

A cross sectional study was conducted at a Tertiary care teaching hospital among the healthcare professionals in Central Tamilnadu for a period of 6 months.

Inclusion criteria: All healthcare providers who provide consent and willing to participate was included in the study.

Exclusion criteria: Healthcare professionals who are not engaged in clinical practice was excluded from the study.

The study carryout by Murchhana et al (2024) had showed that the 56.7% of doctors responded correctly regarding the regimen and dose of antirabies vaccine. Assuming similar observation will be made for our study by allowing 4% precision with 95% confidence level adequate sample size was calculated to be 350. Data was collected using interview method among the study participants. The questionnaire had three parts. Part A consisted of Demographic characteristics; Part B consists of Knowledge on Postexposure Prophylaxis and Part C consisted of Practice on Postexposure Prophylaxis. The study participants were selected using systemic sampling technique. The questionnaire was provided to all study participants. After completion specific educational training session, the knowledge and practices on postexposure prophylaxis was found using the same questionnaire among the study participants. A pilot study consisting of 35 participants was conducted and content validation was done for the questionnaire before administering the questionnaire to the study participants. The cronbach's alpha value was calculated to be 0.76. After collection of data all the data were entered in Microsoft excel sheet and data was analysed using SPSS version 26. Categorical variable was expressed in frequency and percentage while continuous variable was expressed in mean and standard deviation. Paired t test was used to find the association between variables. The study participants were clearly explained about the purpose of the study and their confidentiality was ensured following which consent was obtained from the study participants. The study was conducted after obtaining the institutional ethical clearance.

Result

Table 1: Sociodemographic characteristics of study population

Variable	N	%
Gender		
Male	145	41.4
Female	205	58.6
Age group		
21–30 years	262	74.9
31–40 years	73	20.9
41–50 years	15	4.3
Qualification		
MBBS	220	62.9
MD	85	24.3
MS	45	12.9
Designation		
Postgraduate	100	28.6
Junior Resident	50	14.3
Senior Resident	50	14.3
CRMI	120	34.3
Assistant Professor	30	8.6
Experience		
Newly joined(<6 months)	164	46.9
6 months to 5 years	148	42.3
>5 years	38	10.9
CME attendance after 2020		
Yes	59	16.9
No	291	83.1

Table 2: Knowledge about post exposure prophylaxis on pre- and post-training assessments

Domain	Pre-test % correct	Post-test % correct	Change (%)
Recognition of rabies transmission	98.0%	95.1%	-2.9
Incubation period knowledge	63.7%	91.7%	+28.0
Post-exposure prophylaxis protocol	30.6%	69.4%	+38.8
Wound category classification	86.3%	96.3%	+10.0
Vaccine schedule (updated guidelines)	60.6%	92.3%	+31.7
Contraindications to HRIG	95.7%	97.4%	+1.7
Pre-exposure prophylaxis indications	76.0%	95.7%	+19.7
Intradermal vs intramuscular route	60.0%	88.9%	+28.9

Table 3: Practice about post exposure prophylaxis on pre- and post-training assessments

Domain	Pre-test % correct	Post-test % correct	Change (%)
Initial wound management	45.7%	85.4%	+39.7
Identifying category III exposure	83.4%	95.7%	+12.3
HRIG administration site	56.3%	88.9%	+32.6
Vaccine dose & route selection	62.0%	90.3%	+28.3
Management of immunocompromised	46.6%	84.0%	+37.4
Re-exposure scenario management	48.0%	87.1%	+39.1
Delayed PEP initiation	42.9%	85.1%	+42.2
Animal observation period	72.3%	96.0%	+23.7
Neonatal bite management	43.4%	82.6%	+39.2

Table 4: Comparison of Pre- and post-test scores by designation

Group	Pre-test mean ± SD (%)	Post-test mean ± SD (%)	Improvement mean ± SD (%)	p-value†
All participants (n=350)	**59.2 ± 10.7**	**87.3 ± 6.8**	**+28.1 ± 10.2**	**p < 0.001**
Postgraduate (n=100)	65.0 ± 9.4	89.3 ± 6.2	+24.3 ± 9.1	p < 0.001
Junior Resident (n=50)	59.5 ± 9.8	88.7 ± 6.5	+29.2 ± 9.5	p < 0.001
Senior Resident (n=50)	58.5 ± 10.3	87.6 ± 7.1	+29.1 ± 11.2	p < 0.001
CRMI (n=120)	55.6 ± 10.8	85.4 ± 7.0	+29.8 ± 10.6	p < 0.001
Assistant Professor (n=30)	54.7 ± 11.0	85.3 ± 7.3	+30.6 ± 10.2	p < 0.001
CME attended (n=59)	63.9 ± 10.1	89.7 ± 6.4	+25.8 ± 9.7	p < 0.001
No recent CME (n=291)	58.2 ± 10.6	86.8 ± 6.9	+28.6 ± 10.4	p < 0.001

Table 5: Multivariate logistic regression — predictors of adequate pre-test knowledge (n = 350)

Variable (reference)	Adjusted OR	95% CI	p-value
Gender (Male vs Female)	0.977	0.640 – 1.507	0.918
CME attendance (Yes vs No)	2.554	1.543 – 4.525	0.001*
Age group (per decade, ordinal)	1.003	0.508 – 1.879	0.993
CRMI vs Postgraduate	0.253	0.140 – 0.437	< 0.001*
Senior Resident vs Postgraduate	0.732	0.415 – 1.322	0.292
Junior Resident vs Postgraduate	1.015	0.611 – 1.703	0.957
Asst Professor vs Postgraduate	0.396	0.208 – 0.798	0.008*
Experience <5 yr vs Fresh	1.093	0.647 – 1.952	0.763
Experience >5 yr vs Fresh	0.893	0.391 – 1.981	0.786
MD vs MBBS	0.661	0.397 – 1.181	0.136
MS vs MBBS	0.445	0.252 – 0.764	0.005*

*p<0.05

The study included 350 doctors. More than half were female (58.6%). Most participants were young, aged between 21–30 years (74.9%). The majority held an MBBS degree (62.9%), and the largest designation group was CRMI (34.3%). Nearly half had joined recently (less than 6 months, 46.9%), and most (83.1%) had not attended any Continuing Medical Education (CME) programme after 2020 as seen in Table.1. This shows that the study captured a largely young, recently joined workforce with limited recent training exposure.

After the training programme, doctors showed clear and significant improvement in almost all knowledge and practice areas. The biggest gains were in managing delayed treatment (+42.2%), re-exposure scenarios (+39.1%), initial wound care (+39.7%), and neonatal bite management (+39.2%) as seen in table.2. Areas that were already well known before training such as recognising how rabies spreads (98%) and contraindications to HRIG (95.7%) showed little change. Nearly all improvements were statistically significant ($p < 0.001$), confirming that the training was highly effective in improving both knowledge and clinical practice skills as seen in table 3.

All groups of doctors improved significantly after training ($p < 0.001$ for every subgroup). The overall average score rose from 59.2% before training to 87.3% after — an improvement of about 28 percentage points. Postgraduate doctors had the highest scores both before (65.0%) and after training (89.3%), reflecting their stronger baseline knowledge. CRMIs and Assistant Professors showed the largest absolute gain in the Scores after the training when compared to prior to it (Pretest score were 55.6% & 54.7% respectively), suggesting they benefited the most from the training. Doctors who had previously attended a CME had a higher pre-test score (63.9%) than those who had not (58.2%), confirming that prior CME exposure positively influences baseline knowledge as seen in table.4. This analysis identified which factors predicted whether a doctor had adequate knowledge before the training. Attending a CME after 2020 was the strongest positive predictor. Doctors who attended CME were 2.5 times more likely to have adequate pre-test knowledge (OR = 2.554, p = 0.001). Postgraduate doctors have more knowledge when compared to CRMI doctors (OR = 0.253, $p < 0.001$), showing a clear gap in knowledge. Assistant Professors also had lesser odds (OR = 0.396, p = 0.008). Interestingly, MS degree holders had lower odds than MBBS holders (OR = 0.445, p = 0.005), likely because MS training focuses on surgical specialties where rabies-specific protocols might receive less emphasis. Sex, age, and number of years' experience were not significant predictors, suggesting that designation and recent CME participation matter more than demographic factors as seen in table 5.

Discussion

In the present study, a total of 350 healthcare professionals and CRMIs from a tertiary care

centre were assessed for knowledge about recent guidelines on rabies prophylaxis. The mean pre-test knowledge score was found to be 59.2 ± 10.7%, which indicates that only a moderate level of knowledge was seen among study participants before the educational intervention. After training session, the average post-test score improved significantly to 87.3 ± 6.8% ($p<0.001$), representing an absolute improvement by 28.1%. This clearly shows that a single targeted training session can bring significant improvement in knowledge and strongly supports the need for regular continuing medical education (CME) programs.

The pre-test mean score of 59.2% in our study is comparable to the findings of Murchhana et al. (2024) from Rewa, Madhya Pradesh, where only 56.7% of doctors correctly identified the intradermal (ID) route and dose. This suggests that the level of knowledge among doctors in our region is similar to other parts of India [5].

In contrast, Singh et al. (2023) from Imphal, Manipur found that only 17.5% of junior doctors had adequate overall knowledge a much lower figure than our pre-test mean. This may be due to the fact that our study population included postgraduates and senior residents alongside interns, whereas the Manipur study focused only on junior doctors [6].

Ahmad et al. (2024) from Pakistan found that 82% of HCPs did not receive any formal training on rabies which is very similar to our finding where 83.1% had not attended any CME on rabies-related topics after 2020 [7]. Across both studies, lack of formal training was a major finding. This is similar with Rana et al. (2021) from Bangladesh, where education level and training were strongly associated with better KAP scores ($p\leq0.01$), and with Li et al. (2021) from China, where lower education was independently associated with poorer knowledge (OR=3.77) [8,9].

Knowledge of the updated PEP protocol was correct in only 30.6% of participants a very low proportion for clinical skill. Initial wound management was known by only 45.7%, delayed PEP management by 42.9%, neonatal bite management by 43.4%, and management of immunocompromised patients by 46.6%. Murchhana et al. (2024) similarly found that knowledge of immunocompromised management was low at 42.7%, and that only 44.6% knew about the modification of PEP to PrEP — indicating that knowledge of special situations and updated protocols remains a consistent blind spot across Indian settings [5].

Among the different designations, postgraduates had the highest pre-test mean score (65.0 ± 9.4%), while CRMIs (55.6 ± 10.8%) and Assistant Professors (54.7 ± 11.0%) had the lowest. The relatively lower score of Assistant Professors compared to postgraduates may reflect that senior faculty, who completed their postgraduate training recently, have not been consistently exposed to the updated 2019 National Guidelines. This pattern is consistent with Murchhana et al. (2024), who found that reorientation programs were necessary even for physicians [5].

The lower pre-test score of CRMIs is not surprising given that they are early in their clinical training and may not yet have had structured exposure to rabies prophylaxis protocols. Singh et al. (2023) similarly found that interns scored significantly lower than postgraduates and CRMIs ($p<0.001$) on rabies knowledge. After training, all subgroups improved substantially, with post-test scores ranging from 85.3% to 89.3%, indicating that training effectively reduced intergroup differences. In multivariate logistic regression analysis, attendance at a CME on rabies-related topics after 2020 was the only statistically significant positive predictor of adequate pre-test knowledge (OR 2.554; 95% CI 1.543–4.525; $p=0.001$). This finding is consistent with recommendations from multiple reference studies. Murchhana et al. (2024) explicitly recommended reorientation programs and CMEs for physicians5. Ahmad et al. (2024) found that 82% of HCPs had received no training and linked this to poor performance [7]. Shaban et al. (2025) found that only 17% attended rabies training in the past year, which corresponded to poorer guideline-specific knowledge. Taken together, these findings across multiple countries and settings consistently reinforce the value of structured, periodic continuing education as a key strategy to improve clinical knowledge of rabies prophylaxis [10].

A key strength of this study is the relatively large sample size (n=350), the inclusion of multiple levels of healthcare professionals, and the use of a validated pre-post design that allows direct measurement of training impact. The questionnaire was based on the National Guidelines for Rabies Prophylaxis 2019, ensuring clinical relevance.

Limitations include the single-centre nature of the study, which may limit generalisability to other institutions or regions. The questionnaire-based format may be subject to recall bias or social desirability. Additionally, the post-test was administered immediately after training, and long-term retention of knowledge was not assessed. Future studies should consider follow-up assessments at three or six months to evaluate the durability of the training effect.

Conclusion

This study found that the baseline knowledge of healthcare professionals and CRMIs regarding

recent rabies prophylaxis guidelines was moderate. knowledge gap was Significantly less particularly in areas such as PEP protocols, wound management, delayed PEP initiation, and management of special populations including neonates and immunocompromised patients. These findings are consistent with similar studies from India and other countries, highlighting that knowledge gaps in rabies prophylaxis are a seen nationwide.

Following an educational training session, the knowledge improved, demonstrating the effectiveness of targeted CME interventions. CME attendance was identified as the only significant independent predictor of adequate pre-training knowledge, reinforcing the importance of regular and accessible continuing education for all categories of healthcare providers.

Ultimately, achieving the WHO's "Zero by Thirty" goal of eliminating dog-mediated human rabies by 2030 requires consistently updated healthcare workforce. This study adds to the growing body of evidence that structured, periodic training is a simple, feasible, and highly effective method to close knowledge gaps and ensure that all healthcare professionals can give prompt, correct, and life-saving rabies post-exposure prophylaxis.

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