



Original Research Article

Dog Owners' Beliefs and Their Role in Rabies Prevention in Chengalpattu District: A Cross-Sectional Study

Article History:

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INTRODUCTION

Rabies is a significant global public health threat,

Abstract: Background: Rabies, a deadly disease caused by the rabies virus spreads through dog bites with India's large stray and owned dog populations causing major public health concerns. A lack of adequate human and dog surveillance, resulting in low prioritisation, is often blamed for this paradox. The study examines residents' beliefs and practices regarding dog ownership and their association with rabies risk in Chengalpattu district, assessing these factors and determining the relationship to rabies risk in the study population.

Methodology: A cross-sectional study was conducted among 188 dog owners in five randomly selected villages of Thiruporur block, Chengalpattu district, Tamil Nadu. A semi-structured questionnaire assessed beliefs, practices and rabies awareness. The determinants were analysed through chi-square tests using IBM SPSS v27.

Results: Of the 188 participants, 50.5% currently owned a dog. Rabies vaccination was reported in 41.8% of owned dogs, and only 24.5% of dog bite victims sought post-exposure prophylaxis. Although most participants were aware that rabies is a fatal disease, misconceptions regarding routine vaccination and traditional remedies were noted. Dog ownership practices and residence were associated with a history of dog bite. **Conclusion:** Awareness of rabies was high, but preventive practices were inadequate. Strengthening community education and responsible dog ownership may help reduce rabies risk.

Keywords: Rabies, Dog ownership, Awareness, Practice & Belief

causing over 59,000 human deaths annually, predominantly through dog-mediated transmission in

Asia and Africa. The disease is almost invariably fatal once clinical symptoms appear, yet it remains underprioritized in many endemic regions. India, accounting for approximately one-third of global rabies deaths, faces major challenges due to fragmented control efforts largely focused on post-exposure prophylaxis (PEP) rather than sustainable mass dog vaccination programs (1)(2)

The World Health Organization (WHO) highlights that eliminating dog-mediated rabies necessitates high vaccination coverage in canine populations, timely administration of PEP, and comprehensive public education to improve knowledge and preventive behaviours. Inadequate community awareness and poor dog bite management practices contribute to ongoing transmission in many developing countries (1)(3). Educational interventions have proven effective in enhancing knowledge and health-seeking behaviours; for example, awareness programs among medical students in Chennai significantly increased understanding of rabies prevention and management (4)

Within India, localised efforts have embraced the One Health approach, which integrates human, animal, and environmental health sectors to address rabies holistically. Tamil Nadu exemplifies this, as the first state to implement a multisectoral rabies control program incorporating canine vaccination, sterilisation, waste management to reduce stray dog populations, and public awareness initiatives. This approach, supported by strong political commitment and coordinated inter-agency collaboration, has led to marked declines in human rabies cases (2). Mathematical modelling suggests vaccinating even 7–13% of stray dogs annually could cost-effectively reduce human rabies deaths by up to 90% in Tamil Nadu.

Globally, rabies elimination efforts prioritise achieving at least 70% vaccination coverage in dogs, fostering regional cooperation, and employing innovative strategies such as oral rabies vaccination for free-roaming dogs and mobile vaccination teams. Successful campaigns in regions like Goa, India, demonstrate that integrated One Health frameworks can dramatically lower canine and human rabies incidence, serving as scalable models for endemic areas (1)

Despite these advances, India's challenges remain significant, including managing large stray dog populations, expanding vaccination outreach, optimizing surveillance systems, and ensuring affordable PEP access. The experiences from Tamil Nadu emphasize that a sustained, multisectoral One Health approach—coupled with ongoing educational programs to enhance community awareness—is

crucial to achieving the global target of dog-mediated human rabies elimination by 2030 (3) In this background, the study was conducted to assess the beliefs and practices related to dog ownership among residents in Chengalpattu district and to determine the relationship between dog ownership practices and the risk of rabies in the study population.

Methodology:

Study Design and Setting

This cross-sectional study was conducted for a period of 3 months from September 2024 to November 2024 among adult dog owners and caregivers in five randomly selected villages of the Thiruporur block in Chengalpattu district, Tamil Nadu. The sample size was calculated considering 89% as the expected prevalence of knowledge regarding the need for treatment following a dog bite from the study by Iddi et al.(5) with 5% absolute error and 95% confidence interval, yielding a required sample size of 157. After applying a design effect of 1.2, the final sample size was calculated to be 188.

Sampling method

The study participants were selected by a multistage sampling method. In the first stage, village panchayats in the Thiruporur block of Chengalpattu district were grouped, and five villages were chosen by simple random sampling. In the second stage, within each selected village, households were selected by systematic sampling starting from the right side of the satellite centre, with every *n*th house visited and an eligible adult dog owner or caregiver interviewed until the required sample size was achieved.

Data Collection

Data were collected using an online pre-tested semi-structured questionnaire organised under four domains:

- (a) demographics
- (b) beliefs and practices related to dog ownership
- (c) rabies awareness
- (d) perception of rabies treatment and prevention.

A pilot study was conducted among 30 dog owners using the questionnaire, and based on their responses and feedback, the items were refined. After obtaining informed consent, the final questionnaire was administered through Google Forms to dog owners residing in the selected villages of the Chengalpattu district.

Statistical Analysis

The data were analysed using IBM SPSS Statistics version 27. Descriptive statistics, including frequencies and percentages, were used to summarise demographic characteristics, dog ownership practices, rabies awareness, and perceptions regarding rabies treatment and prevention. The chi-

Do you agree with the following statements about rabies?	Agree n (%)	Disagree n (%)
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Institutional Human Ethics Committee.

square test was applied to assess associations between dog ownership practices, beliefs, and the proxy measure of rabies risk, with a p-value of < 0.05 considered statistically significant.

Ethical consideration

The study was conducted in accordance with ethical guidelines, and approval was obtained from the

All participants were informed about the purpose of the study, the voluntary nature of their participation, and the confidentiality of their responses, and written informed consent was obtained before data collection. Anonymity and confidentiality of the data were maintained throughout the study

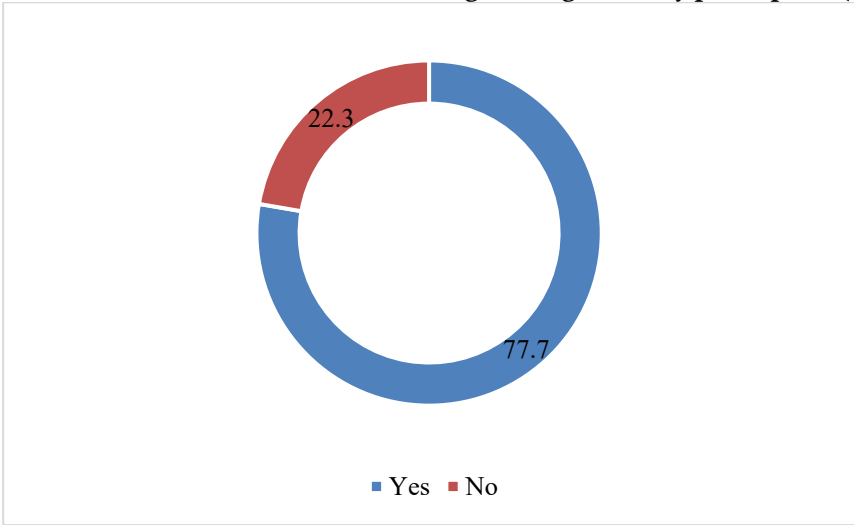
RESULTS

Table 1 summarises dog ownership beliefs and practices among the study participants (N = 188). Current dog ownership was reported by 50.5% of respondents. Among dog owners, 55.9% kept dogs inside the home or tied outside, and 41.8% reported that their dogs were vaccinated against rabies. Following an animal bite, 60.1% reported washing the wound with soap and water, while only 24.5% reported seeking medical care for post-exposure prophylaxis.

Table 1: Dog Ownership Beliefs and Practices

Variable	Frequency (N)	Percentage (%)
Current Dog Ownership		
Currently own a dog	95	50.5 %
Owned a dog in the past	93	49.5 %
Dog Confinement Practice		
Inside home / Tied outside	105	55.9 %
Outside home / Roams freely	83	44.1 %
Dog Rabies Vaccination Status		
Yes (annually / not annually)	58	41.8 %
No / Don't know	130	58.2 %
Belief: Annual Dog Vaccination is Necessary		
Yes	152	71.7 %
No / Not sure	36	22.3 %
First Action After Animal Bite		
Wash with soap and water	113	60.1 %
Apply antiseptic / Don't know	29	15.4 %
Visit doctor for PEP (Correct Definitive Action)	46	24.5 %

Figure 1. Rabies vaccination status of owned dogs among the study participants (N = 188)



Rabies vaccination was reported in 77.7% (146) of owned dogs, while 22.3% (42) were not vaccinated or their vaccination status was not known, as shown in Figure 1.

Table 2: Respondents' knowledge related to rabies (N = 188)

Rabies – serious risk	145(77.1)	43 (22.9)
Spread via animal saliva	141 (75)	47 (25)
Pet vaccination prevents rabies	156 (83)	32 (17)
Washing bite with soap	142 (75.5)	46 (24.5)
Vaccine soon after bite	138 (73.4)	50 (26.6)
Regular pet vaccination not needed*	45 (23.9)	143 (76.1)
Traditional remedies prevent rabies*	82 (43.6)	106 (43.6)
Children taught prevention	162 (86.2)	26 (13.8)

Table 2 describes respondents' knowledge regarding rabies (N = 188). Overall, awareness about rabies was satisfactory, with most participants demonstrating correct knowledge on key aspects of prevention and transmission.

A majority of respondents (77.1%) considered rabies to be a serious disease, and 75% of them were aware that it is transmitted by animal saliva. Preventive measures knowledge was also satisfactory, with 83% agreeing that pet vaccination can prevent rabies and 75.5% recognising the significance of cleaning animal bite wounds with soap and water. Over three-quarters (73.4%) agreed that vaccination should be taken soon after an animal bite.

Certain misconceptions were identified in specific areas. One-fourth of the people, specifically 23.9%, felt that routine pet vaccinations are unnecessary, whereas 43.6% concurred that traditional remedies can prevent rabies. Preventive education awareness was high, with 86.2% of respondents agreeing that children should be educated about rabies prevention.

Table 3: Association between Socio-Demographic Characteristics and Rabies Risk Proxy (History of Dog Bite)
* p value <0.05 – Statistically significant at 95% Confidence Interval, OR – Odd's Ratio

Variable	History of Dog Bite		Total (N=188)	Unadjusted Odds Ratio (95% CI)	p-value
	Present n = 81	Absent n = 107			
Age					
< 34 years	65 (54.6)	54 (54.4)	199 (63.3)	0.64 (0.41 – 0.98)	0.097
> 34 years	29 (42)	40 (58)	69 (36.7)	1	1
Gender					
Female	54 (50.9)	52 (49.1)	106 (56.4)	2.11 (1.16 – 3.84)	0.014*
Male	27 (32.9)	55 (67.1)	82 (43.6)	1	1
Education Level					
High school	43 (52.4)	39 (47.6)	82 (43.6)	1.80 (0.99 – 3.21)	0.051*
Graduate and above	40 (38.1)	65 (61.9)	105 (55.9)	1	1
Residence					
Urban	47 (54)	40 (46)	87 (46.3)	1.86 (1.04 – 3.34)	0.035*
Rural	39 (38.6)	62 (61.4)	101 (53.7)	1	1
Healthcare Worker in Family					
Yes	54 (54)	46 (46)	100 (53.2)	1.81 (1.01 – 3.23)	0.044*
No	35 (39.3)	54 (60.7)	89 (47.3)	1	1
Rabies IEC Exposure					
Yes (Recently/Past)	47 (54.7)	39 (45.3)	86 (45.7)	1.80 (1.00 – 3.20)	0.048*
No/Not sure	41 (40.2)	61 (59.8)	102 (54.3)	1	1

Table 3 presents the association between socio-demographic characteristics and rabies risk, measured by history of dog bite (N = 188). Females had higher odds of reporting a history of dog bite compared to males (OR = 2.11, 95% CI: 1.16–3.84, p = 0.014). Urban residents were more likely to report a history of dog bite than rural residents (OR = 1.86, 95% CI: 1.04–3.34, p = 0.035). Participants with a family member who is a healthcare worker also showed higher odds of a dog bite history (OR = 1.81, 95% CI: 1.01–3.23, p = 0.044). Exposure to rabies IEC was significantly associated with a history of dog bite (OR = 1.80, 95% CI: 1.00–3.20, p = 0.048). Age and education level were not significantly associated with history of dog bite.

4: Association between Dog Ownership Practices, Beliefs, and Rabies Risk Proxy (History of Dog Bite)

p value <0.05 – Statistically significant at 95% Confidence Interval, OR – Odd's Ratio

Table 4 presents the association between dog ownership practices, beliefs, and rabies risk, measured by history of dog bite (N = 188). Current dog ownership was associated with higher odds of dog bite compared to past ownership (OR = 1.85, 95% CI: 1.03–3.33, p = 0.038). Dogs kept inside the home or tied outside had higher odds of bite history than dogs allowed to roam freely (OR = 1.82, 95% CI: 1.01–3.30, p = 0.045). Dog rabies vaccination status showed a significant association, with higher odds of dog bite among those reporting vaccinated dogs compared to those with unvaccinated dogs or unknown status (OR = 2.60, 95% CI: 1.21–5.55, p = 0.014). Providing care to stray dogs was associated with higher odds of dog bite (OR = 1.89, 95% CI: 1.00–3.58, p = 0.049). Dog roaming freely and belief regarding the need for annual vaccination were not significantly associated with history of dog bite.

Table 5. Binomial logistic regression analysis of dog ownership practices and history of dog bite (N = 188)

Variable	P value	Adjusted Odds Ratio (AOR)	95% CI
Gender	0.059	1.86	0.98 – 3.55
Education level	0.086	0.53	0.26 – 1.10
Residence	0.020*	0.45	0.23 – 0.87
Healthcare worker in family	0.216	0.67	0.36 – 1.25
Rabies IEC exposure	0.333	1.35	0.74 – 2.45
Dog confinement practice	0.029*	1.97	1.07 – 3.64
Dog rabies vaccination status	0.265	1.59	0.70 – 3.64

*** P Value < 0.05 - Statistically significant at 95% Confidence Interval, AOR – Adjusted Odd's Ratio**

Table 5 presents the results of the binomial logistic regression analysis examining independent factors associated with history of dog bite. After adjustment, residence and dog confinement practice remained significantly associated. Urban residence was associated with lower odds of dog bite compared to rural residence (AOR = 0.45, 95% CI: 0.23–0.87), while keeping dogs inside the home or tied outside was associated with higher odds of dog bite compared to dogs roaming freely (AOR = 1.97, 95% CI: 1.07–3.64). Other variables did not show a statistically significant association in the adjusted model.

documented low vaccination uptake among owned

Variable	History of Dog Bite		Total (N=188)	Unadjusted Odds Ratio (95% CI)	p-value
	Present n = 81	Absent n = 107			
Dog Ownership Status Currently own a dog Owned a dog in the past	48 (50.5) 33 (35.5)	47 (49.5) 60 (64.5)	95 (50.5) 93 (49.5)	1.85 (1.03 – 3.33) 1	0.038* 1
Dog Confinement Practice Inside home/Tied outside Outside/Roams freely	52 (49.5) 29 (34.9)	53 (50.5) 54 (65.1)	105 (55.9) 83 (44.1)	1.82 (1.01 – 3.30) 1	0.045* 1
Dog Roaming Freely Yes No	31 (53.4) 50 (38.5)	27 (46.6) 80 (61.5)	58 (41.8) 130 (58.2)	1.83 (0.98 – 3.43) 1	0.056* 1
Dog Rabies Vaccination Yes (Annually/Not Annually) No/Don't know	70 (47.9) 11 (26.2)	76 (52.1) 31 (73.8)	146 (77.7) 42 (22.3)	2.60 (1.21 – 5.55) 1	0.014* 1
Belief: Annual Vaccination Yes No/Not sure	62 (40.8) 19 (52.8)	90 (59.2) 17 (47.2)	152 (71.7) 36 (17)	0.61 (0.30 – 1.28) 1	0.193 1
Provide Care to Stray Dogs Yes No	61 (48) 20 (32.8)	66 (52) 41 (67.2)	127 (67.7) 61 (32.4)	1.89 (1.00 – 3.58) 1	0.049* 1

DISCUSSION

The present study assessed beliefs and practices related to dog ownership and their relationship with rabies risk among residents of Chengalpattu district, and the findings show that routine ownership practices and perceptions strongly influence the likelihood of exposure. Rabies is almost invariably fatal once clinical symptoms appear, but remains preventable through timely wound washing, appropriate post exposure prophylaxis, and adequate vaccination coverage in dogs (1).

In this study, only 41.8% of owned dogs were reportedly vaccinated against rabies, which is much lower than the recommended 70% coverage required to interrupt dog mediated transmission (1). Surveys from other Indian and African settings have also

dogs, frequently remaining below 50%, particularly in rural and resource limited communities (2,9,13). Such levels are insufficient to establish herd immunity and help explain the continued dependence on human post exposure prophylaxis rather than sustained mass dog vaccination.

Most participants recognised rabies as a serious disease (77.1%) and knew that it is transmitted through animal saliva (75%), yet 23.9% believed that routine pet vaccination was unnecessary and 43.6% believed that traditional remedies could prevent rabies. Studies among dog owners in Tanzania and Malaysia have reported a similar pattern, where high awareness of rabies severity coexisted with reliance on traditional practices or delayed use of modern treatment (5,10). This discordance between knowledge and behaviour suggests that information

alone does not ensure appropriate preventive action. In the present study, 60.1% of respondents reported washing bite wounds with soap and water, but only 24.5% sought medical care for post exposure prophylaxis. Community based studies from India and Uganda have observed comparable or lower levels of appropriate health seeking after animal bites, with many victims either omitting proper wound care or not completing vaccination, despite understanding that rabies is almost always fatal (2,9,20). These findings underline persistent shortcomings in bite management and demonstrate the need to improve both immediate wound care and timely access to vaccination.

Dog ownership and management patterns were important predictors of exposure. In this study, 55.9% of dog owners kept their dogs inside the home or tied outside, and these households had higher odds of reporting a history of dog bite compared to those allowing dogs to roam freely (AOR 1.97, 95% CI 1.07–3.64). Behavioural research on human–dog interaction has shown that close handling, feeding, and guarding roles within the household increase the chance of provoked bites, which is consistent with this result (11). Rural residence was associated with a higher risk of dog bite than urban residence in the adjusted model (urban AOR 0.45, 95% CI 0.23–0.87), in line with reports that rural communities with more free-roaming dogs and weaker access to veterinary services experience greater exposure to bites (5,13)

Limitations:

This study has certain limitations. As it was cross-sectional, information on beliefs, practices, and history of dog bite was collected at a single point in time and changes over time could not be assessed. Data on dog bites, vaccination status, and preventive practices were self-reported and may be affected by recall error or socially desirable responses. The study was conducted among dog owners in five villages of one rural block in Chengalpattu district, and the findings may not apply to other rural or urban areas. The use of an online questionnaire may have excluded individuals with limited access to smartphones or digital literacy, leading to possible selection bias. In addition, the study focused on quantitative data, and qualitative information that could have provided further insight into dog owners experiences was not collected.

Conclusion:

This study found that dog owners' beliefs and practices were associated with rabies risk in the Chengalpattu district. Although most participants were aware that rabies is a fatal disease gaps were identified in canine vaccination and post-exposure care following dog bites. Dog ownership practices and rural residence were associated with a higher

history of dog bite. Exposure to rabies related information and education activities was limited. Strengthening community education and responsible dog ownership is required to reduce rabies risk.

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