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# ACUTE STRESS DISORDER AND ITS DETERMINANTS AMONG ANIMAL BITE VICTIMS IN AN ANTI-RABIES CLINIC IN BENGALURU

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ABSTRACT

**Background:** Animal bites are traumatic events that cause not only physical injury but also significant psychological distress. The emotional impact ranges from fear and anxiety to acute stress and post-traumatic stress disorders, which may adversely affect the overall well-being of bite victims. Identifying psychological stress among animal bite victims is important for providing comprehensive post-exposure care. This study was conducted to assess acute stress disorder and its determinants among animal bite victims.

**Materials and Methods:** A cross-sectional study was conducted at the Anti-Rabies Clinic of KIMS Hospital, Bengaluru, in 2017. Animal bite victims who provided written informed consent were assessed on day 7 during their third dose of anti-rabies vaccination. A self-report acute stress disorder scale; having a good sensitivity(95%) and specificity(83%) that is based on diagnostic and statistical manual of mental disorders was used. Data was analysed using descriptive statistics and logistic regression to identify factors associated with acute stress disorder.

**Results:** Among 678 animal bite victims, 69.3% reported fear following the bite, while 16.1% experienced dissociative symptoms and 14.2% reported re-experiencing, avoidance, or arousal symptoms. Acute stress disorder was present in 9.9% of subjects and 2.1% were at risk of developing post-traumatic stress disorder. Acute stress disorder was significantly associated with elderly age ≥60 years (AOR=3.1), female gender (AOR=2.4), rural residence (AOR=2.3), unprovoked bites (AOR=2.6), lacerated wounds (AOR=2.6), multiple wounds (AOR=10.0), and multiple exposures (AOR=3.6).

**Conclusion:** Acute stress disorder is a significant psychological consequence among animal bite victims. Psychological assessment and counselling should be integrated into post-exposure prophylaxis services.

**Keywords:** Animal bite, Acute stress disorder, Post-traumatic stress disorder, Anti-rabies clinic.

## INTRODUCTION

Animal bites are a common public health concern and represent a traumatic event with both physical and psychological consequences. While the immediate clinical focus is often directed toward wound management and prevention of rabies, the psychological impact of animal attacks on victims is frequently overlooked. Animal attacks are sudden, unpredictable, and perceived as threatening, which can evoke intense emotional responses such as fear, helplessness, and anxiety.[1] These emotional reactions may persist beyond the physical injury and can lead to significant psychological morbidity if not recognized and addressed appropriately.[2]

Exposure to traumatic events, including animal bites, can precipitate acute stress disorder (ASD), a psychiatric condition characterized by symptoms such as intrusive recollections, avoidance of reminders of the trauma, dissociation, and increased

arousal occurring within the first month following the event.[3] Acute stress disorder represents an early psychological response to trauma and may interfere with daily functioning, sleep, emotional stability, and social interactions. Individuals experiencing acute stress symptoms may develop persistent fear of animals, avoidance behaviors, and emotional distress that adversely affect their quality of life.[4] The severity of psychological response may vary depending on factors such as age, gender, nature of the attack, severity of injury, and prior experiences with animal exposure.[5]

Acute stress disorder is also clinically significant because it is considered an important predictor for the development of post-traumatic stress disorder (PTSD), a more chronic and disabling condition.[6] PTSD develops when trauma-related symptoms persist beyond one month and is characterized by recurrent intrusive memories, avoidance of trauma-related stimuli, negative alterations in mood and cognition, and hyperarousal.[7] The fear associated with animal bites may be further intensified by concerns regarding rabies, a universally fatal disease once clinical symptoms appear, thereby increasing psychological distress among victims.[8]

Despite the recognized psychological impact of traumatic injuries, the assessment of acute stress disorder among animal bite victims is not routinely incorporated into clinical practice, particularly in anti-rabies clinics. Most clinical management focuses on physical injury and prevention of rabies, while psychological consequences remain under-recognized. Early psychological support measures such as trauma-informed care and psychological first aid may help reduce the progression of acute stress reactions.[9] Understanding the magnitude and determinants of acute stress disorder among animal bite victims is essential for ensuring comprehensive patient care and improving overall health outcomes. Therefore, the present study was conducted to assess acute stress disorder and its determinants among animal bite victims attending an anti-rabies clinic in a tertiary care hospital in Bengaluru.

## MATERIALS AND METHODS

A hospital-based descriptive study was conducted at the Anti-Rabies Clinic of the Department of Community Medicine, Kempegowda Institute of Medical Sciences (KIMS) Hospital and Research Centre, Bengaluru, Karnataka. The Anti-Rabies Clinic is a tertiary care facility that provides comprehensive post-exposure prophylaxis (PEP) services, including wound management, anti-rabies vaccination, and rabies immunoglobulin administration, to animal bite victims. Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study. The study was carried out over a one-year period from January to December 2017.

The study population comprised adult animal bite victims attending the Anti-Rabies Clinic for post-exposure prophylaxis during the study period. A purposive sampling method was used. All Animal bite victims aged 18 years and above who attended the Anti-Rabies Clinic during the study period and provided informed consent were included in the study. Individuals presenting with re-exposure to animal bites during the study period were excluded to avoid duplication and confounding of psychological assessment.

A pre-designed and structured case record forms was used to obtain relevant information. The data collected included socio-demographic characteristics such as age, gender, education, and occupation; details related to the biting animal including species and ownership status; and exposure characteristics such as category of exposure and anatomical site of bite. Information regarding post-exposure prophylaxis, including vaccine administration and other recommended management, was also documented.

Acute stress disorder (ASD) was assessed using the Acute Stress Disorder Scale (ASDS), a validated 19-item self-report inventory based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria. The scale has demonstrated high sensitivity (95%) and specificity (83%) for identifying acute stress disorder. Participants were assessed on the third day following the bite exposure, when they returned to the clinic for administration of the second dose of anti-rabies vaccination, in order to capture early psychological responses following the traumatic event.

The collected data was entered in Microsoft Excel and analysed using Stata version 12.1. Descriptive statistics were used to summarise the data in terms of frequencies, proportions, and percentages. Univariate and multivariate logistic regression analyses were performed to identify predictors of acute stress disorder among animal bite victims.

## RESULTS

A total of 678 animal bite victims who gave informed consent and completed the forms were analyzed for assessing acute stress disorders following animal bites; during the year 2017, by administering acute stress disorder scale.

**Table 1: Stress disorders among animal bite victims**

| Stress disorders (n = 678) | Characteristics | Number |
|---|---|---|
| Frightening | Present | 470(69.3) |
| | Absent | 208(30.7) |
| Dissociative manifestations | Present | 109(16.1) |
| | Absent | 569(83.9) |

| | | |
|---|---|---|
| Re-experience, avoidance & arousal symptoms | Present | 96(14.2) |
| | Absent | 582(85.8) |
| Acute Stress Disorders | Present | 67(09.9) |
| | Absent | 611(90.1) |
| Risk of developing Post-traumatic Stress Disorders | Present | 14(02.1) |
| | Absent | 664(97.9) |

**Figures in parenthesis indicate percentages**

Among the study subjects, 69.3% of them were frightened by the animal bite; dissociative symptoms were present in 16.1% of study subjects and re-experience, avoidance & arousal symptoms because of animal bites were present among 14.2% of the study population. Considering the overall symptoms; as per the ASDS scale, the acute stress disorders were present among 9.9% of the animal bite victims and 2.1% were at the risk of developing post-traumatic stress disorders.

**Table 2: Association between socio-demographic characteristics and stress disorders**

| Socio-demographic Characteristics (n=678) | | Acute stress disorder | | Odds Ratio (95% CI) | P- Value |
|---|---|---|---|---|---|
| | | Yes (67) | No (611) | | |
| Age group | 19-59 | 51 | 548 | - | - |
| | ≥ 60 | 16 | 63 | 2.7(1.5-5.0) | 0.001 |
| Gender | Male | 29 | 402 | - | - |
| | Female | 38 | 209 | 2.5(1.5-4.2) | <0.0001 |
| Education | Literate | 57 | 543 | - | - |
| | Illiterate | 10 | 68 | 1.4(0.7-2.9) | 0.3 |
| Occupation | Employed | 53 | 526 | - | - |
| | Unemployed | 14 | 85 | 1.6(0.5-3.1) | 0.1 |
| Residence | Urban | 44 | 528 | - | - |
| | Rural | 23 | 83 | 3.3(1.9-5.8) | <0.0001 |

The association between socio-demographic characteristics of animal bite victims with acute stress disorder was calculated by univariate logistic regression and it was found that, acute stress disorder was significantly high among elderly age group ≥ 60 years (OR= 2.7; 95% CI 1.5-5.0), females (OR= 2.5; 95% CI 1.5-4.2), and bite victims from rural area (OR= 3.3; 95% CI 1.9-5.8).

**Table 3: Association between characteristics of exposure and stress disorders**

| Characteristics of animal exposure (n=678) | | Acute stress disorder | | Odds Ratio (95% CI) | P- Value |
|---|---|---|---|---|---|
| | | Yes (67) | No (611) | | |
| Circumstances of Exposure | Provoked | 7 | 162 | - | - |
| | Unprovoked | 60 | 449 | 3.1(1.3-6.9) | 0.006 |
| Place of Exposure | Home | 4 | 107 | - | - |
| | Outside home | 63 | 504 | 3.3(1.2-9.3) | 0.02 |
| Biting Animal | Dog | 65 | 547 | 3.8(0.9-15.9) | 0.06 |
| | Other animal | 2 | 64 | - | - |
| Vaccination Status of animal | Vaccinated | 2 | 88 | - | - |
| | Unvaccinated | 65 | 523 | 5.5(1.3-22.7) | 0.02 |
| Fate of Biting Animal | Healthy | 32 | 326 | - | - |
| | Sick | 5 | 57 | 0.9(0.3-2.4) | 0.8 |
| | Died /Killed | 5 | 51 | 0.9(0.4-2.7) | 0.9 |
| | Not traceable | 25 | 177 | 1.4(0.8-2.5) | 0.2 |
| Type of Exposure | Abrasion | 11 | 282 | - | - |
| | Laceration | 17 | 139 | 3.1(1.4-6.9) | 0.004 |
| | Punctured wound | 8 | 119 | 1.7(0.7-4.4) | 0.2 |
| | Multiple wounds | 31 | 71 | 11.2(5.3-23.3) | <0.01 |
| Site of Exposure | Head & neck | 5 | 19 | 2.9(1.0-8.2) | 0.04 |
| | Upper limb | 17 | 181 | 1.0(0.6-1.9) | 0.9 |
| | Lower limb | 34 | 373 | - | - |
| | Trunk\Genitals | 2 | 17 | 1.3(0.3-5.8) | 0.7 |
| | Multiple site | 9 | 21 | 4.7(1.9-11.0) | <0.01 |
| Category of Exposure | Category I/II | 3 | 48 | - | - |
| | Category III | 64 | 563 | 1.8(0.6-6.0) | 0.3 |

The association between characteristics of animal bite with acute stress disorder was calculated by univariate logistic regression analysis, it was found that, acute stress disorders was significantly high among animal bite victims who had unprovoked bites (OR= 3.1; 95% CI 1.3-6.9), exposures outside home (OR= 3.3; 95% CI 1.2-9.3), unvaccinated animal bites (OR= 5.5; 95% CI 1.3-22.7), lacerated wounds (OR= 3.1; 95% CI 1.4-6.9), multiple wounds(OR= 11.2; 95% CI 5.3-23.3), bite wounds on head & neck (OR= 2.9; 95% CI 1.0- 8.2) and significantly high in multiple site exposures (OR= 4.7; 95% CI 1.9-11.0).

**Table 4: Association between individual variable and acute stress disorders**

| Variables (n=678) | | Adjusted Odds Ratio (95% CI) | Std. Error | Z value | P- Value |
|---|---|---|---|---|---|
| Age group | 19-59 | - | - | - | - |
| | ≥ 60 | 3.1(1.6-6.4) | 1.1 | 3.2 | 0.002 |
| Gender | Male | - | - | - | - |
| | Female | 2.4(1.3-4.3) | 0.7 | 3.0 | 0.003 |
| Residence | Urban | - | - | - | - |
| | Rural | 2.3(1.2-4.5) | 0.8 | 2.5 | 0.01 |
| Circumstances of Exposure | Provoked | - | - | - | - |
| | Unprovoked | 2.6(1.1-6.4) | 1.2 | 2.1 | 0.03 |
| Place of Exposure | Home | - | - | - | - |
| | Outside home | 3.0(0.9-9.7) | 1.8 | 1.9 | 0.06 |
| Vaccination Status of animal | Vaccinated | - | - | - | - |
| | Unvaccinated | 3.7(0.8-16.2) | 2.8 | 1.7 | 0.08 |
| Type of Exposure | Abrasion | - | - | - | - |
| | Laceration | 2.6(1.1-5.9) | 1.0 | 2.3 | 0.02 |
| | Punctured wound | 1.7(0.7-4.7) | 0.9 | 1.1 | 0.3 |
| | Multiple wounds | 10.0(4.5-22.1) | 4.1 | 5.7 | <0.01 |
| Site of Exposure | Head & neck | 3.2(0.9-11.1) | 2.0 | 1.8 | 0.07 |
| | Upper limb | 1.5(0.7-3.0) | 0.5 | 1.1 | 0.2 |
| | Lower limb | - | - | - | - |
| | Trunk\Genitals | 0.9(0.2-5.2) | 0.8 | 0.04 | 0.9 |
| | Multiple site | 3.6(1.3-9.9) | 1.8 | 2.5 | 0.01 |

In order to assess overall effect of various variables on development of acute stress disorders, the multiple logistic regression was applied to the variables that were statistically significant in the univariate logistic regression analysis. It was found that occurrence of acute stress disorder was significantly high among elderly age group ≥ 60 years (AOR= 3.1; 95% CI 1.6-6.4), females (AOR= 2.4; 95% CI 1.3-4.3), bite victims from rural area (AOR= 2.3; 95% CI 1.2-4.5), unprovoked animal bites (AOR= 2.6; 95% CI 1.1-6.4), lacerated wounds (AOR= 2.6; 95% CI 1.1-5.9), multiple wounds (AOR= 10.0; 95% CI 4.5-22.1), and multiple exposures (AOR= 3.6; 95% CI 1.3-9.9).

## DISCUSSION

The present study highlights that animal bites are not merely physical injuries but psychologically traumatic events capable of precipitating acute stress disorder (ASD). Nearly one in ten victims (9.9%) fulfilled criteria for ASD, and 2.1% were at risk of developing post-traumatic stress disorder (PTSD). In addition, a substantial proportion experienced fear, dissociation, and re-experiencing symptoms. These findings reinforce emerging evidence that psychological morbidity following animal bites is clinically significant and requires systematic attention.

Studies conducted in India have similarly documented acute stress reactions among animal bite victims. A study from Thiruvananthapuram reported that 3% of victims developed ASD, with a larger proportion experiencing fear and dissociative symptoms.[10] Menon et al. also observed considerable psychological distress among bite victims in Kerala, emphasizing the need for mental health screening within the clinics.[11] Although prevalence estimates vary, likely due to methodological and contextual differences, these findings consistently indicate that animal bite exposure can trigger acute stress responses.

Evidence from paediatric population further supports the traumatic impact of dog bites. Vincent et al. documented post-traumatic stress disorder among children following dog attacks, demonstrating that such injuries can have enduring psychological consequences.[12] Similarly, Ji et al. reported persistent post-traumatic stress symptoms among dog bite victims.[13] While the present study focused on adults, the findings are parallel to those observed in children, suggesting that the sudden and unpredictable nature of animal attacks, coupled with perceived threat and fear of rabies, contributes significantly to psychological distress.

Acute stress disorder is clinically important because it is a recognized precursor to PTSD. Prospective trauma studies demonstrate that individuals meeting criteria for ASD are at significantly higher risk of developing chronic PTSD.[14,15] Creamer et al. found a strong association between early acute stress reactions and later PTSD among severely injured trauma survivors.[16] Similarly, Mason et al. identified injury-related factors and early stress symptoms as predictors of PTSD.[17] These findings highlight the importance of early identification of ASD in animal bite victims to prevent long-term psychological sequelae.

The present study identified elderly age as an independent predictor of ASD. Older adults may perceive animal attacks as more life-threatening due to physical vulnerability and comorbid conditions. Trauma research suggests that perceived threat severity and reduced resilience increase susceptibility to acute stress reactions.[14,18] Furthermore, older individuals may experience heightened anxiety regarding recovery and potential disability, intensifying stress responses.

Female gender was also significantly associated with ASD. This finding aligns with the quantitative review by Tolin and Foa, which demonstrated that women are nearly twice as likely as men to develop PTSD

following trauma exposure.[19] Gender differences in neurobiological stress regulation, coping mechanisms, and sociocultural roles may explain this increased vulnerability. Recognition of gender disparities is important for tailoring psychological support strategies.

Rural residence emerged as another significant determinant. Rural populations may have limited access to healthcare services and reduced awareness regarding rabies prevention, increasing anxiety following exposure. Epidemiological studies in India have shown that fear of rabies and uncertainty regarding outcomes contribute to psychological distress among bite victims.[20,21] Limited mental health infrastructure in rural areas may further delay recognition and management of acute stress symptoms.

Exposure-related characteristics were strongly associated with ASD. Unprovoked bites significantly increased the risk, consistent with trauma literature demonstrating that unpredictable events produce greater psychological disruption.[14] Severe injuries, including lacerations and multiple wounds, were also independently associated with ASD. Previous studies confirm that objective injury severity and subjective perception of life threat are among the strongest predictors of acute stress reactions and PTSD.[15,17] Multiple injuries may intensify pain, prolong recovery, and reinforce traumatic memories, thereby compounding psychological morbidity.

The use of the Acute Stress Disorder Scale (ASDS) in the present study strengthens the validity of findings. The ASDS has been shown to be a reliable and valid self-report instrument for identifying acute stress disorder in trauma-exposed populations.[22] Incorporating validated screening tools into anti-rabies clinics is feasible and may enhance early detection.

Early psychological intervention is critical. Evidence from systematic reviews indicates that timely psychosocial interventions can reduce acute traumatic stress symptoms and potentially prevent progression to PTSD.[23] Integrating brief counselling, reassurance, and trauma-informed care into post-exposure prophylaxis services could therefore improve holistic patient outcomes.

## CONCLUSION

Acute stress disorder was present in nearly one in ten animal bite victims, with elderly individuals, females, rural residents, and those with severe or unprovoked injuries at higher risk. These findings highlight that animal bites are psychologically traumatic events. Integrating routine psychological screening, early counselling, and supportive care into anti-rabies clinic services is essential to ensure holistic management and prevent progression to long-term disorders such as post-traumatic stress disorder.

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