International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Website: https://ijmpr.in/

Original Article

A cross-sectional study of burden of Scrub Typhus in the District of Vizianagaram, Andhra Pradesh

Dr. Lavanya Gudapuri MD, MPH[1], Dr. D. Ch. S. Vara Prasad, MD[2], Dr. T. Parvathi, MD[3], Dr. B. Arunasree, MD[4]

[1]Assistant Professor, Department of Microbiology, Government Medical College, Vizianagaram
[2]Assistant Professor, Department of Community Medicine, Government Medical College, Vizianagaram
[3]Associate Professor, Department of Microbiology, Government Medical College Vizianagaram
[4]Professor & HOD, Department of Microbiology Government Medical College Vizianagaram

OPEN ACCESS

Corresponding Author:

Dr. Lavanya Gudapuri,
MD, MPH,
Assistant Professor, Department of Microbiology,
Government Medical College, Vizianagaram

Received: 16-03-2026
Accepted: 13-04-2026
Published: 18-04-2026

ABSTRACT

Background: Scrub typhus, caused by Orientia tsutsugamushi, is a re-emerging zoonotic infection and an important cause of acute febrile illness in India. Delayed diagnosis due to non-specific clinical presentation contributes to significant morbidity and mortality, particularly in endemic and underserved regions.
Objectives: To determine the prevalence, demographic distribution, geographic pattern, and seasonal variation of scrub typhus among suspected cases attending a tertiary care hospital in Vizianagaram district, Andhra Pradesh.
Methodology: A retrospective, descriptive cross-sectional study was conducted at the IDSP laboratory, Government General Hospital, Vizianagaram, from September 2023 to December 2024. Laboratory records of 287 patients with fever for more than five days, clinically suspected of scrub typhus and tested using IgM ELISA, were analyzed. Demographic details, area of residence (tribal/non-tribal), and month of diagnosis were evaluated. Data was analyzed using appropriate statistical methods, and results were expressed as proportions.
Results: Of the 287 samples tested, 43 (14.98%) were positive for scrub typhus IgM antibodies. Positivity was nearly equal among males (51.2%) and females (48.8%). The highest burden was observed in the 30–44 years age group (30.2%), followed by 15–29 years (27.9%). Pediatric cases (0–14 years) accounted for 18.6% of positives. A significantly higher prevalence was noted in tribal areas (24.1%) compared to non-tribal areas (12.7%) ($p < 0.05$). Seasonal analysis revealed a significant post-monsoon peak, particularly during October to December ($p < 0.05$).
Conclusion: Scrub typhus is a significant contributor to acute febrile illness in Vizianagaram district, with higher risk among tribal populations and during post-monsoon months. Enhanced clinical awareness, timely laboratory diagnosis, and targeted public health interventions are essential to reduce disease burden and complications.

Keywords: *Scrub Typhus, Orientia tsutsugamushi, Acute Febrile Illness, Post-Monsoon.*

INTRODUCTION

Scrub typhus is a re-emerging disease in the South-East Asian region caused by *Orientia tsutsugamushi*. It has emerged as a major cause of acute febrile illness, particularly in the pediatric population. The disease has a wide spectrum of clinical manifestations, ranging from a mild, self-limiting illness to severe complications such as acute respiratory distress syndrome (ARDS), meningoencephalitis, acute kidney injury (AKI), myocarditis leading to heart failure, hepatitis, and multi-organ failure. Globally, approximately one million new cases are reported each year (1,2). Various studies have reported case fatality rates ranging from 1–11% among treated cases. Among untreated cases, the case fatality rate has been reported to be as high as 30–70% (3). Delay in diagnosis and treatment, due to a low index of suspicion and non-specific clinical presentation, contributes significantly to the high case fatality rate in scrub typhus. Hence, early diagnosis is essential to initiate prompt and specific treatment, thereby reducing complications and mortality.

Clinical diagnosis of scrub typhus can be challenging, as other endemic infections such as dengue, chikungunya, malaria, and leptospirosis present with similar clinical features. Therefore, laboratory confirmation is essential for initiating specific

treatment. Currently, microbiological diagnostic methods for scrub typhus are based on the detection of IgM antibodies in serum or the detection of bacterial nucleic acid by polymerase chain reaction (PCR) (4). IgM antibodies against scrub typhus typically appear 5–6 days after the onset of fever and may persist for several months following acute illness. Immunofluorescence assay (IFA) can be used to detect IgM antibodies in samples such as cerebrospinal fluid (CSF). PCR assays are usually positive only during the bacteremic phase of infection (5). Detection of IgM antibodies by various modalities such as enzyme-linked immunosorbent assay (ELISA) and immunochromatographic tests is commonly used in most hospitals, as these methods are cost-effective and easier to perform compared to PCR assays.

In the new millennium, there has been a resurgence of scrub typhus cases in India, with outbreaks reported from several states including Uttar Pradesh, Bihar, West Bengal, and Assam. (6). Some studies attribute this resurgence to factors such as climate change, population growth, deforestation, urbanization, and the diversion of forest land for agricultural use. Several studies from India have reported an increasing prevalence of scrub typhus in states such as Uttar Pradesh and Odisha (7, 8). Vizianagaram district of Andhra Pradesh shares a border with Odisha and has a similar climatic profile. The present study aims to determine the prevalence and distribution of scrub typhus in Vizianagaram district.

Aim:
To study the epidemiology and climatic variation of Scrub typhus disease in the district of Vizianagaram.

Objectives:

1) To study the prevalence of Scrub Typhus among the patients suspected of having Scrub typhus attending the Government General Hospital, Vizianagaram.
2) To observe the demographic profile of the Scrub Typhus positive patients identified in the Government General Hospital, Vizianagaram.
3) To compare Scrub Typhus Positive pattern among Tribal and Non-Tribal areas of Vizianagaram District.
4) To assess the association of Scrub Typhus cases with climatic conditions in the district of Vizianagaram.

MATERIALS AND METHODS:
Study Design:

Study Type:
This is a retrospective, descriptive cross-sectional study

Study Setting:
The study is conducted at the IDSP laboratory, Government General Hospital, Vizianagaram.

Study Period:
This study was conducted from September 2023 to December 2024.

Sampling technique: Purposive sampling technique

Sample size: 287

Study Population:
The lab records of the patients who came to the Government General Hospital, Vizianagaram both Out-Patient & In-Patient Departments who are suspected of Scrub typhus and sent for IgM Scrub Typhus Assay in the IDSP lab, Department of Microbiology, GGH Vizianagaram were studied from September 2023 to December 2024.

Inclusion Criteria:
All the cases, both Out-patient and In-Patient with complaint of fever for more than 5 days with a provisional diagnosis of Scrub Typhus and who have been tested for Scrub Typhus IgM ELISA test in the IDSP laboratory, Government General Hospital, Vizianagaram were included in this study.

Exclusion criteria:
All the patients who were not tested for Scrub Typhus IgM ELISA assay in the IDSP laboratory, Government General Hospital, Vizianagaram are excluded from the study.

METHODOLOGY:
The Records of the patients from both in-patient and out-patient in the Government General Hospital, Vizianagaram, who were suspected to have Scrub Typhus, who were tested for IgM ELISA for Scrub Typhus were obtained and analyzed.

Ethical Considerations:
Prior permission is obtained from the Ethics Committee, Government Medical College, Vizianagaram for the conduction of the study. Prior permission is obtained from the Superintendent, Government General Hospital for examination of patient records for the study. All the patient records which are accepted into the study are coded with a study ID number. Only the

demographic indicators and location of residence of the patients are included in the study with no personal information to protect the privacy of the patients included in the study.

Data Analysis:
The data obtained from these records was analyzed using appropriate statistical tests and is presented as graphs, tables and charts. The categorical variables in the study were presented as percentages, graphs, tables and charts. Appropriate statistical tests were performed.

RESULTS:
During the study period a total of 287 samples were screened for Scrub typhus in the Government general Hospital, Vizianagaram. Out of the total study population, 159 samples (55.40%) were collected from male patients while 128 samples (44.60%) were collected from female patients. Out of the patients evaluated for acute febrile illness, 43 patients (14.98%) were positive for Scrub Typhus IgM antibodies, indicating that scrub typhus constitutes a significant etiological contributor to febrile illnesses in this region.

The distribution of Scrub Typhus was nearly equal between genders, with 22 males (51.2%) and 21 females (48.8%) testing positive. The male-to-female ratio was approximately 1.05:1, indicating no significant gender predilection in this study population. This near-equal distribution suggests that both males and females in the study area are similarly exposed to risk factors such as agricultural activities and rural living conditions.

Scrub Typhus positivity showed a clear age-related trend. The highest proportion of positive cases was observed in the 30–44 years age group (13/43; 30.2%), followed by the 15–29 years age group (12/43; 27.9%). Together, these economically productive age groups accounted for 58.1% of all positive cases.

Pediatric patients (0–14 years) contributed 18.6% of Scrub Typhus cases, highlighting a substantial pediatric case burden. Positivity declined sharply beyond 60 years of age, with only 2 cases (4.7%) in the 60–74 years age group and no cases above 75 years. The predominance of cases among young and middle-aged adults suggests increased occupational or environmental exposure, while pediatric involvement indicates endemic transmission within the community.

A notable finding was the higher proportion of Scrub Typhus positivity in tribal areas. Among the 58 patients from tribal regions, 14 (24.1%) were positive, compared to 29 of 229 patients (12.7%) from non-tribal areas which is a significant observation. $p < 0.05$. (0.000027). Thus, patients from tribal areas had nearly twice the prevalence of Scrub Typhus compared to those from non-tribal regions. It is observed that 8 samples were tested positive for scrub typhus among the age group of 0 – 14 years. Among these 6 (75%) were found to be from tribal areas. This is a significant observation $p = 0.00029$. This may reflect increased exposure to vector habitats, dense vegetation, poor housing conditions, and limited access to early healthcare in tribal areas.

Month-wise distribution revealed a distinct seasonal pattern. Scrub Typhus cases peaked during the post-monsoon and winter months, with the highest number in November 2023 (11 cases), followed by October 2024 (6 cases) and December 2024 (5 cases). This is a significant observation $p = 0.0034$ ($p < 0.05$). Minimal or no cases were observed during the summer months, indicating strong seasonality. The post-monsoon rise likely corresponds to increased vector density and favorable environmental conditions for mite proliferation.

Table 1: Gender wise distribution of cases

Gender	Positive	Negative	Total
Female	21	107	128
Male	22	137	159
Total	43	244	287

Table 2: Demographic data of the cases

Age	Positive	Negative	Total
0 – 14 years	8	50	58
15 – 29 years	12	68	80
30 – 44 years	13	48	61
45 – 59 years	8	46	54
60 – 74 years	2	30	32
75 – 85 years	0	2	2
Total	43	244	287

Table 3: Scrub Typhus Data in Vizianagaram District

Sl. No	Scrub Typhus Result	Number
1	Positive	43
2	Negative	244

3	Total	287

Table 4: Distribution of Cases in Tribal and Non-Tribal areas

Sl. No	Positive	Negative	Total
Tribal Areas	14	44	58
Non-Tribal Areas	29	200	229
Total	43	244	287

Table 5: Gender wise distribution of cases in Tribal and Non- tribal Areas

Region	Male			Female			Grand Total
	Positive	Negative	Total	Positive	Negative	Total	
Tribal Areas	7	26	33	7	18	25	58
Non- Tribal Areas	15	111	126	14	90	104	229
Total	22	137	159	21	108	129	287

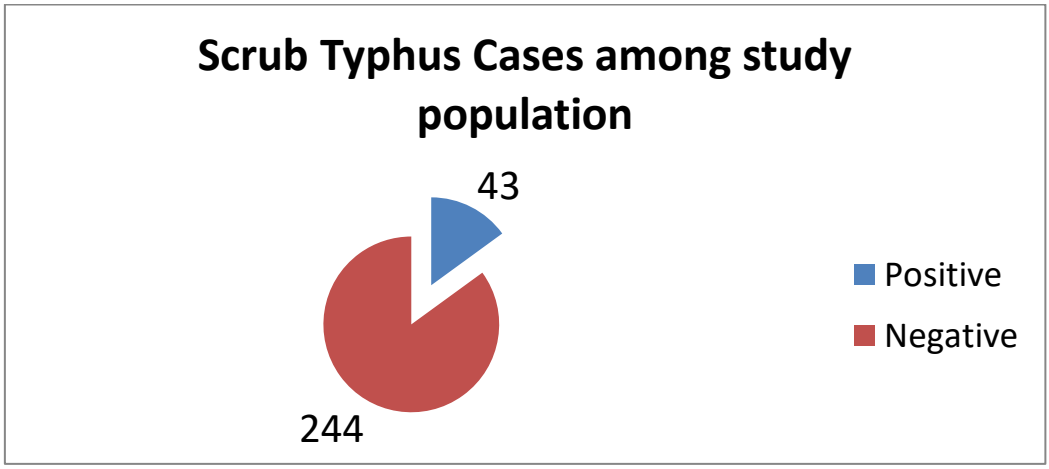
Table 6: Demographic Data of cases in the Tribal Areas

S.NO	POSITIVE	NEGATIVE	Total
0 - 14 Years	8	50	58
15-29	12	68	80
30-44	13	48	61
15-59	8	46	54
60-74	2	30	32
75-99	0	2	2

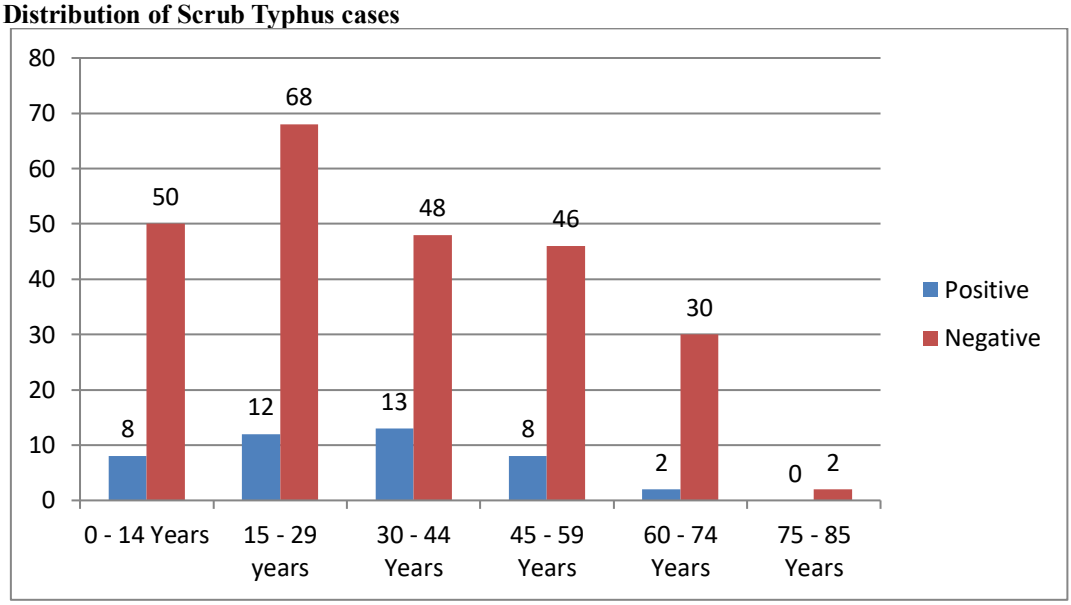
Table 7: Month And Year Wise Distribution

Sl. No.	Year	Month	Positive	Negative	Total
1	2023	September 23	0	10	10
2	2023	October 23	7	23	30
3	2023	November 23	11	19	30
4	2023	December 23	3	23	26
5	2024	January 24	0	19	19
6	2024	February 24	2	10	12
7	2024	March 24	1	19	20
8	2024	April 24	3	24	27
9	2024	May 24	0	7	7
10	2024	June 24	0	0	0
11	2024	July 24	0	0	0
12	2024	August 24	0	0	0
13	2024	September 24	2	14	16
14	2024	October 24	6	18	24
15	2024	November 24	3	23	26
16	2024	December 24	5	36	41
		Total	43	244	287

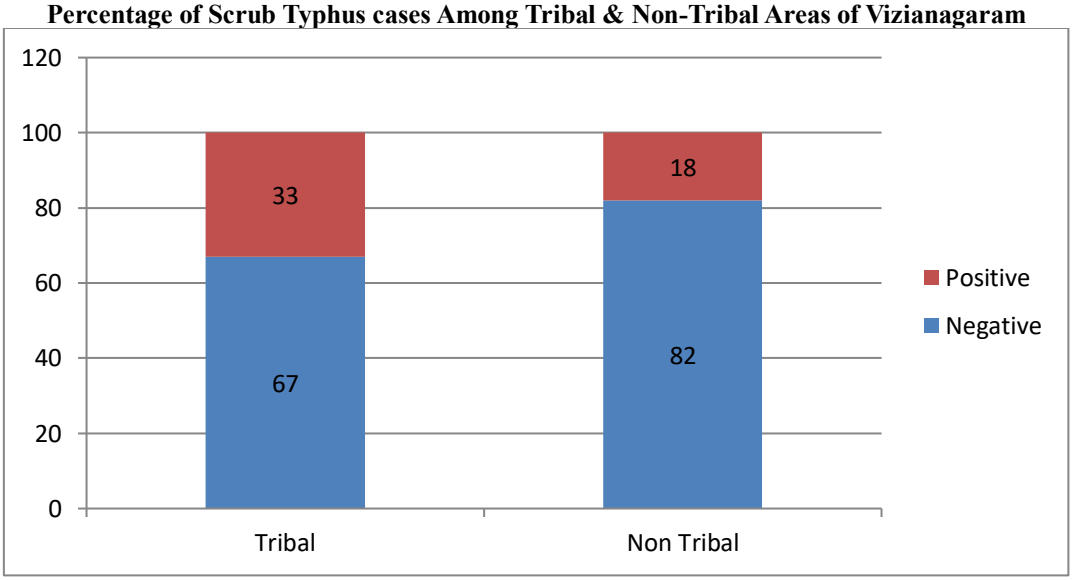
SCRUB TYPHUS CHARTS



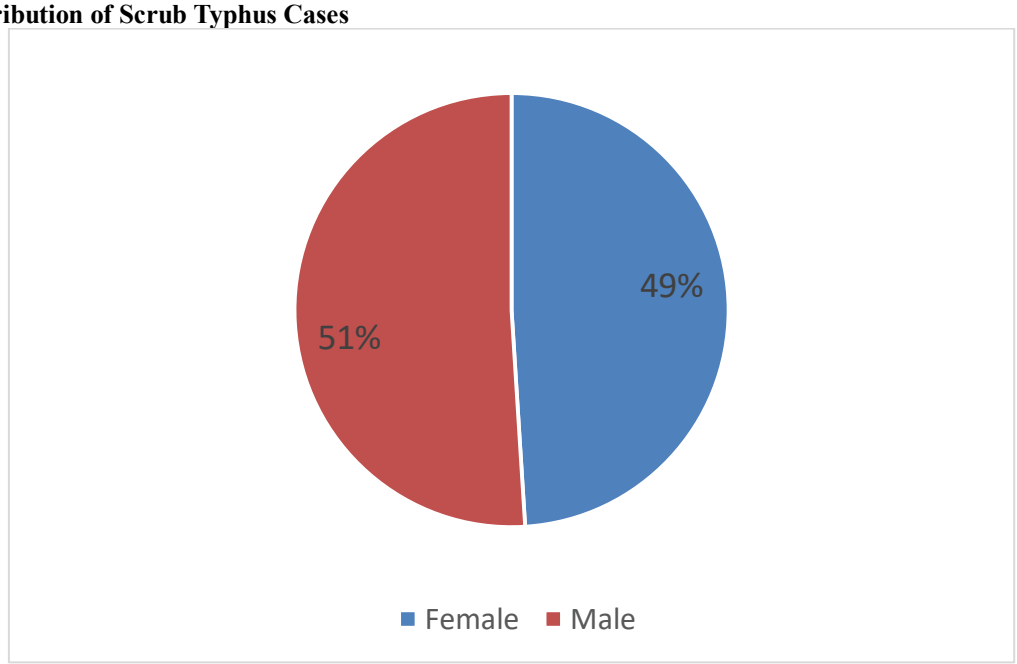
Age Wise Distribution of Scrub Typhus cases



Percentage of Scrub Typhus cases Among Tribal & Non-Tribal Areas of Vizianagaram



Genderwise Ditribution of Scrub Typhus Cases



DISCUSSION:

In our study 14.98% of the individuals tested for Scrub Typhus were found positive for Scrub Typhus. This corresponds to the study done by Rahul Narang et al(9) who reported a Positive rate of 15.89% among the individuals tested for Scrub Typhus and also our study population is similar to that of the Rahul Narang et al (9) where the screened individuals are presented to the hospital with Acute febrile Illness and typical rural Indian population at risk for Scrub Typhus. Among the studies conducted in the community, Gayathri Sondhiya et al(10) have reported prevalence of 30.23% in South India region while Emily Devasagayam et al (11)have reported a prevalence of 34.2% in the South India.

In our current study we have found that prevalence of scrub typhus is slightly higher in males (51.2%) compared to females (48.8%). It corresponds to the study done by Van Ramliana et al (12) in Mizoram who reported 50.9% prevalence among male patients and 49.1% prevalence among female patients. In the study conducted by Rahul Narang et al(9) has reported 51.7% prevalence among males and 48.3% prevalence among the females.

In our this study we have observed that 18.6% of the patients below 15 years are positive for scrub typhus which corresponds with the study of Emily Devasagayam et al who reported 20.56% of patients below 15 years of age were positive for scrub typhus. Children below the age of 15 years are at risk for scrub typhus. In a study done by Madhusmita Bal et al, where the etiology of Acute febrile Illness among pediatric age group was investigated, it was found that 48.7% of the cases were due to scrub typhus. (13). Scrub typhus often goes undiagnosed among the pediatric age groups as it may present with generalized symptoms rather than specific symptoms such as presence of eschar. Pediatric age groups are also at risk to develop neurological complications. (14). In a study by Tina Damodar et al it was found that more than half (54%) of pediatric patients presented with Acute Encephalitis Syndrome were positive for Scrub Typhus. (1). According to the study by Gayathri Sondhiya et al, the case fatality rates of patients presented with Acute Encephalitis Syndrome ranged from 33% in Western India to 9.7% in North-Eastern India. According to the study by Van Ramliana et al, the risk factors for mortality include eschar presence, occupational exposure and young age. Hence it can be observed that pediatric age group is more vulnerable to developing fatal complications. 58.13% of the cases positive for Scrub typhus were among the reproductive and working age group i.e. from 15 – 60 years. This corresponds to the findings of Rahul Narang et al who reported 60.87% of cases positive for scrub typhus among the ages from 21 years to 60 years. In the study by Emily Devasagayam et al, most cases of scrub typhus were found among young adults with a median age of 28.1 years. This may be due to the exposure to the scrub vegetation to the study group. In our study, the study group is mostly rural people working in fields with exposure to vegetation.

In our study 20.9% of the scrub typhus positive cases are from urban areas. This corresponds to that of Emily Devasagayam et al who reported 18.3% positive scrub typhus cases in their study. In our study 32.5% of the scrub typhus cases are from Tribal areas. This is a significant finding ($p < 0.05$). In the study by Panigrahi et al it was observed that scrub typhus positive cases were clustered around Ganjam district of Southern Odisha which is a tribal district. (15). Devamani et al studied regional variation of scrub typhus cases in Southern India, where it was observed that more cases were found among the regions covered in forests. (16). This may be due to the habitat of the thromboculid mite, the vector of *O. tsutsugamushi*, the causative agent of scrub typhus is more prevalent in areas with scrub vegetation.

In our study 61.67% of the positive scrub typhus cases were during the post – monsoon season i.e. in the months of October, November and December. In studies by Rahul Narang et al, Van Ramliana et al they have observed that there is increase in the scrub typhus cases in the monsoon and post – monsoon season. This may be attributed to the farming practices which are mostly practiced during these months and immediately after rainfall. People have higher exposure to the thromboculid mites during farming practices which can cause an increase in the positive scrub typhus cases.

CONCLUSION

The present study demonstrates that scrub typhus is an important cause of acute febrile illness in Vizianagaram district, with an overall seropositivity rate of 14.98%. The infection predominantly affected individuals in the productive age group of 15–60 years, likely due to increased occupational exposure to scrub vegetation, while children below 15 years constituted a vulnerable group with a higher risk of severe disease. A slight male predominance was observed, consistent with findings from other Indian studies.

A significant clustering of cases was noted in tribal areas, where the prevalence was considerably higher compared to urban regions, emphasizing the influence of environmental factors and vector habitat. The disease showed a clear seasonal pattern, with a marked increase during the post-monsoon months of October to December, correlating with agricultural activities and increased exposure to the vector.

These findings underscore the need for increased awareness among clinicians, especially during the post-monsoon season, and in high-risk populations such as children and tribal communities. Early diagnosis and prompt treatment of scrub typhus are essential to prevent complications and reduce morbidity and mortality. Strengthening surveillance and implementing targeted public health interventions in endemic and tribal areas are crucial for effective disease control.

REFERENCES:

1. Damodar, T., Singh, B., Prabhu, N., Marate, S., Gowda, V. K., Lalitha, A., Dsouza, F. S., Sajjan, S. V., Kariyappa, M., Kinhal, U. V., Prathyusha, P., Desai, A., Thennarasu, K., Solomon, T., Ravi, V., & Yadav, R. (2023). Association of Scrub Typhus in Children with Acute Encephalitis Syndrome and Meningoencephalitis, Southern India. *Emerging Infectious Diseases*, *29*(4), 711–722. https://doi.org/10.3201/eid2904.221157
2. Garg, D., & Manesh, A. (2021). Neurological facets of scrub typhus. *Annals of Indian Academy of Neurology*, *24*(6), 849–864. https://doi.org/10.4103/aian.aian_739_21
3. Ravi, V., Hameed, S. K. S., Desai, A., Mani, R. S., Reddy, V., Velayudhan, A., Yadav, R., Jain, A., Saikia, L., Borthakur, A. K., Sharma, A., Mohan, D. G., Bhandopadhyay, B., Bhattacharya, N., Inamdar, L., Hossain, S., Daves, S., Sejvar, J., Dhariwal, A. C., . . . Srikantiah, P. (2022). An algorithmic approach to identifying the aetiology of acute encephalitis syndrome in India: results of a 4-year enhanced surveillance study. *The Lancet Global Health*, *10*(5), e685–e693. https://doi.org/10.1016/s2214-109x(22)00079-1
4. Paris, D., Aukkanit, N., Jenjaroen, K., Blacksell, S., & Day, N. (2009). A highly sensitive quantitative real-time PCR assay based on the groEL gene of contemporary Thai strains of Orientia tsutsugamushi. *Clinical Microbiology and Infection*, *15*(5), 488–495. https://doi.org/10.1111/j.1469-0691.2008.02671.x
5. Kore, V. B., & Mahajan, S. M. (2022). Recent threat of scrub typhus in India: a narrative review. *Cureus*, *14*(10), e30092. https://doi.org/10.7759/cureus.30092
6. Konyak, B. M., Soni, M., Saikia, S., Chang, T., Gogoi, I., Khongstid, I., ... & Pandey, R. P. (2024). Scrub typhus in Northeast India: epidemiology, clinical presentations, and diagnostic approaches. *Transactions of The Royal Society of Tropical Medicine and Hygiene*, *118*(3), 206-222.
7. Pathania, M., Malik, P., & Rathaur, V. K. (2019). Scrub typhus: Overview of demographic variables, clinical profile, and diagnostic issues in the sub-Himalayan region of India and its comparison to other Indian and Asian studies. *Journal of Family Medicine and Primary Care*, *8*(3), 1189-1195.
8. Bharathi, M., Kalyani, C. S., & Sirisha, T. (2023). AN OUTBREAK OF SCRUB TYPHUS IN a REMOTE VILLAGE-AN OVERVIEW. *International Journal of Current Pharmaceutical Research*, 15–19. https://doi.org/10.22159/ijcpr.2023v15i4.3015
9. Narang, R., Deshmukh, P., Jain, J., Jain, M., Raut, A., Deotale, V., Pote, K., & Rahi, M. (2022). Scrub typhus in urban areas of Wardha district in Central India. *Indian Journal of Medical Research*, *156*(3), 435–441. https://doi.org/10.4103/ijmr.ijmr_707_19
10. Sondhiya, G., Manjunathachar, H. V., Singh, P., & Kumar, R. (2024). Unveiling the burden of scrub typhus in acute febrile illness cases across India: A systematic review & meta-analysis. *Indian Journal of Medical Research*, *159*, 601–618. https://doi.org/10.25259/ijmr_1442_23
11. Devasagayam, E., Dayanand, D., Kundu, D., Kamath, M. S., Kirubakaran, R., & Varghese, G. M. (2021). The burden of scrub typhus in India: A systematic review. *PLoS Neglected Tropical Diseases*, *15*(7), e0009619. https://doi.org/10.1371/journal.pntd.0009619
12. Ramliana, V., Pautu, L., Rosangkima, G. et al. The economic burden of scrub typhus disease among the tribal ethnic groups (Mizo) of Mizoram State, Northeast India. BMC Public Health 25, 1067 (2025). https://doi.org/10.1186/s12889-025-22302-5
13. Bal, M., Mohanta, M.P., Sahu, S. et al. Profile of Pediatric Scrub Typhus in Odisha, India. Indian Pediatrics 56, 304–306 (2019). https://doi.org/10.1007/s13312-019-1519-1
14. Murhekar, M. V., Mittal, M., Prakash, J. A. J., Pillai, V. M., Mittal, M., Kumar, C. G., ... & Gupte, M. (2016). Acute encephalitis syndrome in Gorakhpur, Uttar Pradesh, India–Role of scrub typhus. Journal of Infection, 73(6), 623-626.
15. Panigrahi, A., Narasimham, M. V., Biswal, M., Bisht, K., Mishra, B., & Parida, B. (2023). Epidemiology of scrub typhus in a tertiary care hospital of Southern Odisha: a cross sectional study. Indian Journal of Medical Microbiology, 42, 92-96.
16. Devamani, C., Alexander, N., Chandramohan, D., Stenos, J., Cameron, M., Abhilash, K. P. & Schmidt, W. P. (2025). Incidence of scrub typhus in rural South India. New England Journal of Medicine, 392(11), 1089-1099.