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OCCURRENCE AND CLINICAL PROFILE OF SCRUB TYPHUS IN PATIENTS WITH ACUTE FEBRILE ILLNESS IN A TERTIARY CARE CENTER IN SOUTH INDIA

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ABSTRACT

Background: Scrub typhus is a zoonotic infection with varied clinical presentation and is one of the important causes of Acute Undifferentiated Febrile Illness (AUFI). Increased awareness regarding the presentation and complications of the disease facilitates appropriate and timely management of the cases. The study was conducted with the aim to estimate the occurrence of scrub typhus among patients with acute febrile illness, to characterise the demographic and clinical profile of the positive cases, and to identify factors associated with severe disease.

Materials and Methods: This descriptive observational study included 200 patients aged 18 years and above who were admitted with a history of acute febrile illness from August 2024 to July 2025. The patients were tested for scrub typhus by the Weil-Felix test and positive results were confirmed by detecting IgM antibodies. Scrub typhus cases were further characterised by their demography, clinical presentation and laboratory parameters. Patients showing features suggestive of organ involvement were characterised as severe scrub typhus. The chi-square test and Fisher's exact test was used to assess the association between categorical data and disease severity. A two-tailed p value of <0.05 was considered statistically significant for all outcomes.

Results: The proportion of scrub typhus was found to be 12%, with the majority of the cases being reported during the monsoon months of August and September. The mean age of the patients was 38.2 ± 18.3 years, with a predominance of female patients and in rural areas. The most common symptom was fever, followed by abdominal pain, cough, headache, vomiting, rash, eschar, loose stools, myalgia and breathlessness. Systemic examination findings included oedema, splenomegaly, lymphadenopathy and hepatomegaly. The most common abnormality in laboratory parameters was thrombocytopenia seen in 75% of the cases, followed by raised transaminases, raised serum bilirubin, leucopenia, leucocytosis and raised serum creatinine levels. The most common complication observed was hepatitis, followed by multiorgan dysfunction syndrome, acute kidney injury, shock, acute respiratory distress syndrome (ARDS) and meningoencephalitis. No mortality was observed in this set of scrub typhus cases. Patients with severe disease had significantly lower platelet counts ($p=0.011$) and higher serum aminotransferases ($p < 0.001$) compared to mild cases of scrub typhus.

Conclusion: Our study reiterates the demographic and clinical profile of scrub typhus and identifies factors associated with severe disease. Early diagnosis and prompt initiation of appropriate antibiotic therapy can prevent the development of severe complications and mortality.

Keywords: Scrub Typhus, Acute febrile illness, Orientia tsutsugamushi, clinical profile.

INTRODUCTION

Scrub typhus is a potentially fatal acute febrile illness. It is a Rickettsial disease caused by the obligate intracellular bacterium *Orientia tsutsugamushi*. It is transmitted among humans by the bite of the larva of the trombiculid mite Leptotrombidium called as chigger.[1,2] The disease is named variedly as Tsutsugamushi disease, chiggerosis, mite borne typhus fever, or tropical typhus.[3]

The disease affects one billion people globally with one million cases occurring every year.[1] It is found in large numbers in the Asia-Pacific region, especially in the area called as the 'tsutsugamushi triangle" extending from Pakistan in the west, Japan in the east and Australia in the South with India present within the triangle.[4] However, over the last decade, globally cases of scrub typhus have been reported from areas outside the triangle.[5] The occurrence of scrub typhus increases during the monsoon season of June to November when mites lay eggs leading to increased occurrence of infected chiggers particularly in areas of scrub vegetation.[6]

The disease presents with fever, headache, conjunctivitis, myalgia, lymphadenopathy, rash, gastrointestinal symptoms and eschar.[2,4] Orientia tsutsugamushi invades the endothelial cells, causing disseminated vasculitis and perivascular inflammation, leading to vascular leakage and end-organ damage.[6] Complications include acute respiratory distress syndrome (ARDS), encephalopathy, Disseminated Intravascular Coagulation (DIC), myocarditis and Multiple Organ Dysfunction Syndrome (MODS).[2] A rarely documented complication of scrub typhus is post-infectious laryngitis occurring due to oedema and decreased mobility of the vocal cords.[7] Studies from India have demonstrated a varied case fatality rate from 1.3% to 33.5%.[8] However, majority of the patients who receive appropriate treatment recover from the disease.[9]

Scrub typhus has re-emerged as an important cause of acute febrile illness in India. An analysis of 15 years data from 2009 to 2023 from the Integrated Disease Surveillance Programme (IDSP) has recorded 127 outbreaks with 3751 cases and 93 deaths with a case fatality rate of 2.48%. The majority of the outbreaks occurred in the year 2023, indicating an emergence of scrub typhus in India.[10] Factors such as increased growth of population, urbanisation and availability of newer diagnostic tests facilitating specific diagnosis could have contributed to the increasing trend in the cases. In addition, global warming, rising humidity, increased human participation in outdoor activities leading to exposure to the vectors can also contribute to the elevated numbers of scrub typhus.[4]

Scrub typhus has varied clinical presentations with nonspecific early symptoms. Typical features like eschar formation are difficult to appreciate in many patients, making the diagnosis difficult.[11] The presence of eschar is inconsistent and has been found variedly from 20% to 87% of the cases.[12] Scrub typhus can affect multiple organs and thus differentiating the disease from malaria, dengue, leptospirosis, other rickettsiosis and enteric fever can be challenging.[6] A high index of suspicion coupled with the availability of specific diagnostic tests is essential to make a diagnosis to facilitate prompt initiation of antibiotics. However, scrub typhus remains an underdiagnosed infection often presenting as pyrexia of unknown origin due to lack of diagnostic facilities, decreased awareness and non-specific clinical manifestations.[13,14] Serology remains the mainstay in the diagnosis of scrub typhus. The oldest and most common test used is the Weil-Felix test, which can aid in timely diagnosis of scrub typhus despite its lack of sensitivity. Other serological tests include the Microimmunofluorescence Assay (MIF) which is considered the gold standard for the diagnosis of scrub typhus and IgM antibody detection by Enzyme Linked Immunosorbent Assay. Rapid point-of-care tests based on the principle of immunochromatography are also available. Early identification of severe cases is essential to guide timely management and reduce morbidity and mortality.

Polymerase chain reaction (PCR) based tests facilitate the early detection of the disease before antibodies become detectable.[4,15]

The epidemiology of scrub typhus differs among different geographical areas based on the climate and heterogeneity in the etiological agent as well as the transmitting vector.[8]

The current study was conducted with the objectives to estimate the proportion of scrub typhus among patients with acute febrile illness in our hospital, to characterise the demographic and clinical profile of the positive cases and to enumerate the factors associated with severe disease.

MATERIALS AND METHODS

Study design and ethical approval: A descriptive observational study was conducted in the Microbiology department of Shridevi Institute of Medical Sciences and Research Hospital, Tumkur, Karnataka. Approval of the Institutional Ethics Committee (EC/NEW/INST/2025/KA/0607) was obtained prior to the commencement of the study. The study adhered to the tenets of the Declaration of Helsinki.

Study population and duration: 200 patients aged 18 years and above who were admitted to the Medicine department with history of Acute Febrile Illness from August 2024 to July 2025 were included in the study. Patients with confirmed alternate diagnosis including Malaria, Dengue Fever, Leptospirosis, Chikungunya, Enteric fever, etc were excluded from the study. Immunocompromised

patients and pregnant women were also not included in the study.

Case definitions: Scrub typhus case: Patients admitted to the Medicine department with a febrile illness with or without an eschar and confirmed positive for scrub typhus by IgM rapid card test.

Severe Scrub typhus Case (Cases with evidence of organ involvement)[8]:

- Patients with scrub typhus presenting with ARDS defined as PaO2/FiO2 ratio of <200 mmHg and/or reduced saturation with bilateral chest infiltrates in the absence of heart failure/cardiomegaly.
- Hepatitis is defined as total bilirubin >2mg/dL with elevation of aminotransferases
- Acute Kidney Injury (AKI) is defined as serum Creatinine >1.5 mg/dL
- Shock is defined as an arterial systolic blood pressure of < 90 mmHg and/or refractory shock requiring ionotropes.
- Thrombocytopenia with a platelets count <100,000 cells/mm^3
- Myocarditis is defined as elevated CKMB and Troponin T and abnormal echocardiography.
- Meningitis is defined as symptoms of neurological involvement like headache, altered sensorium, seizure and vomiting with or without raised CSF protein levels in the absence of other causes.
- Multiorgan Dysfunction Syndrome (MODS) is defined as dysfunction of two or more organ systems.

Data collection: All the eligible patients were tested for scrub typhus by performing the Weil-Felix Test using the Progen kit from Tulip Diagnostics. Further confirmation was done by IgM detection using scrub typhus (Tsutsugamushi) IgM & IgG Card (J. Mitra & Co. Pvt. Ltd.). Based on the principle of immunochromatography, the kit has a sensitivity of 98.03% and a specificity of 97.60% as per kit literature. However, a study conducted by Acharya et al., which compared the rapid kit against ELISA, demonstrated a sensitivity of 89.6% and a specificity of 84%. (16). All patients testing positive for scrub typhus IgM were further characterised by their demography, clinical presentation and laboratory parameters. Patients showing features suggestive of organ involvement were characterised as having severe scrub typhus.

Statistical Analysis: Descriptive data regarding patient characteristics were summarised using suitable measures of central tendencies for continuous data, like mean and standard deviation for variability. The categorical data was presented as frequencies and percentages. The chi-square test or Fisher's exact test was used to assess the association between categorical data and disease severity. For continuous data, an independent t-test was used to assess significance between the groups when the data was normally distributed and a Mann-Whitney U test was used when the assumption of normality was not met. A two-tailed p value of <0.05 was considered statistically significant for all outcomes.

RESULTS

This study describes the clinical and laboratory profile of scrub typhus cases and explores factors associated with disease severity in a tertiary care hospital. A total of 200 patients who were admitted to the medicine department with symptoms suggestive of acute undifferentiated febrile illness were included in the study. Among the total AUFI cases, 54 patients tested positive by Weil-Felix test. On further testing for IgM antibodies, 24 patients tested positive for scrub typhus, corresponding to a proportion of 12.0% (95% confidence interval: 7.9%–17.3%).

The majority of the cases of scrub typhus were obtained in the months of September (n = 9, 37.5%) and August (n = 6, 25%). [Figure 1] illustrates the monthly distribution of cases of scrub typhus during the study duration.

[Table 1] enumerates the demographic and clinical characteristics of patients with scrub typhus. The mean age was found to be 38.2 ± 18.3 years, with female predominance (n=18, 75%). The male-to-female ratio was 0.3:1. The majority of the patients were from rural areas (n=16, 66.67%) and 29.17% of the patients had at least one comorbidity. The co-morbidities identified were diabetes mellitus (n=5, 20.83%) and hypertension (n=5, 20.83%).

The most common symptom was fever, which was present in all the patients identified with scrub typhus. The average duration of fever was 6.625 ± 2.85 days. The other symptoms identified were abdominal pain (54.17%), cough (41.67%), headache (33.33%), vomiting (33.33%), rash (29.17%), eschar (29.17%), loose stools (29.17%), myalgia (25%) and breathlessness (8.33%). Out of the seven patients in whom eschar was identified, three patients had the eschar on the chest, three patients on the abdomen and one patient in the axilla. In female patients, eschar was most commonly observed on the chest and abdomen, whereas in male patients it was observed on the abdomen and axillary region.

Systemic examination findings included oedema (25%), splenomegaly (20.83%), lymphadenopathy (16.67%) and hepatomegaly (12.5%). The average length of hospital stay was found to be 7 ± 2.43 days. Laboratory evaluation revealed thrombocytopenia (platelet count <1.5 lakh/Cumm) in 75% of the patients with 50% of the patients, showing platelet counts less than 1 lakh/Cumm. Leucopenia was a more frequent finding (n=7, 29.17%) in comparison to leucocytosis (n=5, 20.83%). Transaminases were elevated in 50% of the patients and serum bilirubin was raised in 33.33%. Deranged serum creatinine levels were seen in 16.67% of the patients. The mean C-reactive protein levels were found to be 7.89 ± 4.49 mg/dL.

The most common complication observed was hepatitis (n=12, 50%), followed by multiorgan

dysfunction syndrome (n=11, 45.83%) and acute kidney injury (n=4, 16.67%). The other complications observed were shock (n=3, 12.5%), ARDS (n=2, 8.33%) and meningoencephalitis (n=1, 4.17%). Three patients required intensive care unit (ICU) admission. No mortality was observed in this set of scrub typhus cases.

Severe scrub typhus was observed in 15 (62.5%) patients. Table 3 enumerates the factors associated with severe disease. Patients with severe disease had significantly lower platelet counts (p=0.011) and higher serum aminotransferases ($p < 0.001$) compared to mild cases of scrub typhus. However, no significant association was found between gender, clinical findings, serum creatinine, C-reactive protein levels and disease severity. The length of hospital stay was found to be marginally longer in severe cases (7.2 ± 2.51 versus 6.67 ± 2.40), although this did not reach statistical significance (p = 0.5685). No significant association was found between variations in total leukocyte count and disease severity.

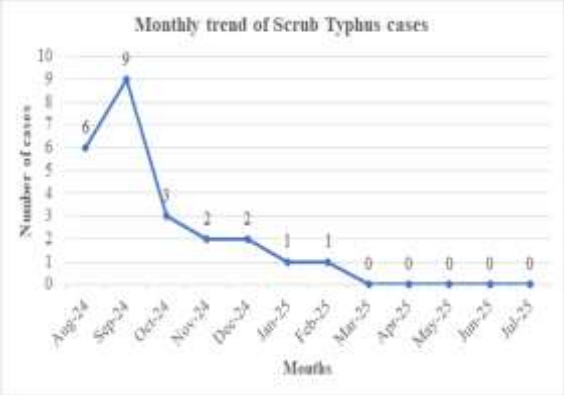

Figure 1: Monthly trend of Scrub Typhus (n = 24).

Table 1: Demographic and Clinical Characteristics of patients with Scrub Typhus

Characteristics		**n = 24**
Age in years (Mean ± SD)		38.2 ± 18.3
Gender (n, %)	Male	06 (25%)
	Female	18 (75%)
Residence (n, %)	Urban	08 (33.33%)
	Rural	16 (66.67%)
Co-morbidity (n, %)	Absent	17 (70.83%)
	Presence of at least one co-morbidity	07 (29.17%)
Clinical Features (n, %)		
Fever		24 (100%)
Headache		08 (33.33%)
Myalgia		06 (25%)
Vomiting		08 (33.33%)
Abdominal pain		13 (54.17%)
Cough		10 (41.67%)
Breathlessness		02 (8.33%)
Rash		07 (29.17%)
Eschar		07 (29.17%)
Loose stools		07 (29.17%)
Examination findings (n, %)		
Hepatomegaly		03 (12.5%)
Splenomegaly		05 (20.83%)
Lymphadenopathy		04 (16.67%)
Oedema		06 (25%)
Length of hospital stay in days (Mean ± SD)		7.0 ± 2.43

Table 2: Laboratory Parameters and Complications Observed in Patients with Scrub Typhus

Characteristics	**n = 24**
Laboratory parameters (n, %)	
Thrombocytopenia (<1.5 lakh/Cumm)	18 (75%)
Leucopenia	07 (29.17%)
Leucocytosis	05 (20.83%)
Raised Transaminases	12 (50%)
Raised Bilirubin	08 (33.33%)
Raised Serum Creatinine	04 (16.67%)
C-Reactive Protein in mg/dL (Mean ± SD)	7.89 ± 4.49
Organ Involvement (n, %)	
Acute Respiratory Distress Syndrome (ARDS)	02 (8.33%)
Hepatitis	12 (50%)
Acute Kidney Injury	04 (16.67%)
Shock	03 (12.5%)
Thrombocytopenia (<1.0 Lakh/Cumm)	12 (50%)
Myocarditis	00 (0%)
Meningoencephalitis	01 (4.17%)
Multi Organ Dysfunction Syndrome (MODS)	11 (45.83)
ICU Admission	03 (12.5%)
Mortality	00 (0%)

Table 3: Factors Associated with severe disease

Variable		Mild Scrub Typhus (n=9)	Severe Scrub Typhus (n=15)	p-value
Age (years) (Mean ± SD)		42.56 ± 12.90	35.53 ± 20.93	0.1074
Gender (n)	Male	04	02	0.2235
	Female	05	13	
Eschar (n)		02	05	0.9077
Hepatomegaly (n)		0	03	0.4256
Splenomegaly (n)		1	04	0.6970
Hypotension (n)		0	03	0.4256
Oedema (n)		0	06	0.1954
Thrombocytopenia (<1.0 lakh/Cumm) (n)		1	11	0.011
Leucopenia (n)		2	5	0.9077
Leucocytosis (n)		0	5	0.1534
Elevated Serum Aminotransferase (n)		0	12	< 0.001
C-Reactive Protein in mg/dL (Mean ± SD)		5.989 ± 4.53	9.03 ± 4.21	0.1099
Length of stay in days (Mean ± SD)		6.67 ± 2.40	7.2 ± 2.51	0.5685

DISCUSSION

Scrub typhus is a re-emerging infection and an important cause of AUFI, as it presents with no obvious focus of infection.[17,18] It presents with varied symptoms and a lack of classical signs like eschar formation can make a definitive clinical diagnosis difficult. As the disease can have non-specific symptoms, a high index of suspicion coupled with appropriate laboratory tests is required to make an accurate diagnosis.[19] The Weil-Felix test is the most widely available serological test for the diagnosis of scrub typhus. It however has low sensitivity with false positive results being seen in Typhoid and other diseases and a negative result does not rule out scrub typhus.[1] In a study conducted by Kamath et al., 16.7% of scrub typhus patients showed false-positive Dengue NS1 antigen test which were negative for Dengue fever on further confirmation. Such situations further complicate the diagnosis of scrub typhus delaying specific treatment.[20] Our study attempts to estimate the hospital- based proportion and to describe the clinical pattern of scrub typhus cases. We also attempt to enumerate the factors associated with severe disease.

Among the 200 eligible patients with acute febrile illness included in our study, the proportion of scrub typhus was found to be 12%. Similar findings were observed by Lakshmi et al., in Telangana, who demonstrated an proportion of 13.7% in patients with acute pyrexia.[18] A systematic review that analysed 89 studies conducted in India estimated a proportion of 25.3% scrub typhus cases among patients with AUFI.[4]

In our study, the majority of the cases were observed during the months of August and September. A similar occurrence was seen in studies conducted in Telangana, Dharmapuri and Bangalore.[8,21,22] A study conducted by Tilak et al., who analysed 15-year pooled data of the IDSP also showed that the majority of the cases were reported from July to September.[10] Chiggers flourish at low temperatures and high humidity, which is seen during the monsoon and post-monsoon seasons, leading to an increase in the cases.[5] However, a study conducted in Rajasthan showed an increase in cases during the drier and warmer months of March and April, highlighting the diverse epidemiology of the disease.[23]

The mean age of the patients was found to be 38.2 ± 18.3 years. Similarly, other studies have also demonstrated a predominance of cases among adults between 20 and 40 years. The mean age of the adult population in a study conducted by Shwetha et al., was found to be 32.9 years.[22]

Our study showed a female predominance among the cases. Kamath et al., and Takar et al., also demonstrated a female predominance in their study of 61.9% and 63.6% respectively.[20,24] A community-based seroprevalence study conducted in South India by Devamani et al., also demonstrated a higher incidence of seroconversion in females than males (age-adjusted RR 1.5, 95% CI 1.2, .9). However, a study conducted by Chunduru et al., demonstrated a male predominance of 57.9%.[25] Similar findings were obtained by Jose et al., in Kerala and Dhar et al., in Bubaneshwar, who demonstrated a male predominance of 55.9% and 67%, respectively.[26,27] No gender difference was observed in incidence of scrub typhus cases in a study conducted in Telangana.[18] This variation in gender distribution may be attributed to differences in gender-specific outdoor or occupational activities across different geographical areas. Moreover, the peri-domestic transmission of scrub typhus in some areas could contribute to the increased exposure in women.[28] The majority of the patients in our study were from a rural background, which was consistent with other similar studies conducted in India.[20,21]

The most common presenting symptom was fever, which was present in all the patients with scrub typhus. The average duration of fever was 6.625 ± 2.85 days. Other similar studies have also found fever to be the most consistent symptom.[20,21] The other symptoms identified were abdominal pain (54.17%), cough (41.67%), headache (33.33%), vomiting (33.33%), rash (29.17%), loose stools (29.17%), myalgia (25%) and breathlessness (8.33%). In accordance with our study, similar findings were observed by Kumar et. al., showing 100% occurrence of fever followed by vomiting, myalgia, abdominal pain and headache.[21] In a study by Shwetha et al., the most common symptom was fever, followed by

rash, vomiting, headache, abdominal pain, altered sensorium, joint pain and pedal oedema.[22]

Eschar, which is considered one of the pathognomonic signs of scrub typhus was appreciated in only 29.1% of the patients. A study conducted by Kumar et al. showed a much lower occurrence of 3.75%.[21] Kamath et al. demonstrated an occurrence of 38.1% and Shwetha et al. demonstrated eschar in 4% of the cases.[22] Meena et al. also demonstrated eschars in only 4.7% of the cases.[29] In a study conducted by Jose et al. in Central Kerala, which evaluated 34 scrub typhus cases, eschar was not demonstrated in any of the cases.[26] Eschars have been found to be rare in patients from South-East Asian countries.[2] Though presence of a typical eschar helps towards coming to a diagnosis of scrub typhus, its absence does not rule the disease out. Scrub typhus should be considered, especially in endemic areas, even if the eschar is absent.[5] Out of the seven patients in whom eschar was identified, three patients had the eschar on the chest, three patients on the abdomen and one patient in the axilla. Dhar et al. also demonstrated the majority of the eschars in the thorax and abdomen, followed by the groin and axilla.[27] On clinical examination, pedal oedema was the most common sign elicited, followed by splenomegaly, lymphadenopathy and hepatomegaly consistent with other similar studies.[21,22]

Laboratory evaluation revealed that thrombocytopenia was the most frequent alteration followed by raised transaminases. Deranged creatinine levels were seen in 16.67% of the patients. Similar findings were observed by Kumar et al., who reported elevated transaminases and thrombocytopenia is 68.75% and 67.5% of patient, respectively.[21] In a study conducted in Northern India, thrombocytopenia was seen in 89.9% of cases.[30] Kamath et al. also demonstrated elevated transaminases in 71.8% of the cases.[20] Thrombocytopenia and elevated transaminases may reflect a systemic inflammatory response and endothelial injury, which are characteristic pathological features of severe scrub typhus.

Leukopenia was seen in 29.17% and leucocytosis was seen in 20.83% of the cases. Leucocytosis was exclusively found in patients with severe scrub typhus infection, though this difference was not found to be statistically significant. Kamath et al. also demonstrated the occurrence of both leukopenia and leucocytosis in scrub typhus patients, with leucocytosis being more frequent (34.3%) than leukopenia (15.6%).[20] Similar findings were obtained by Meena et al in Uttar Pradesh.[29] Kumar et al. also demonstrated leucocytosis in 36.7% of the cases.[31]

The most common complication observed was hepatitis, followed by multiorgan dysfunction syndrome (MODS) and acute kidney injury. The other complications observed were shock, ARDS and meningoencephalitis with three patients requiring ICU admission. Similarly, Kumar et. al. also recorded acute renal failure in 18.75% of the cases, followed by ARDS and MODS in 13.75% of patients each.[21] Kamath et. al. demonstrated ARDS and MODS in 16.7% of cases each.[20] A study conducted in Uttarakhand also enumerated hepatic dysfunction as the commonest complication followed by respiratory and renal dysfunction.[31] Meena et. al. also demonstrated a similar incidence of complications in Uttar Pradesh.[29]

No mortality was observed in this set of scrub typhus cases. Similar findings were obtained by Kamath et. al. and Lakshmi et. al., who recorded a case fatality rate of zero among their patients.[18,20] All the patients included in our study recovered with the administration of Doxycycline. Rapid initiation of antibiotic treatment has been found to reduce the duration of illness, minimise the likelihood of development of complications and thus reduce mortality.[1] The reduced mortality in our study could be attributed to early diagnosis, prompt treatment and reduced virulence of the organism. In line with our findings, several studies have demonstrated a reduction in mortality rate in scrub typhus.[17] A study evaluating the 4 year mortality trend of scrub typhus in South India demonstrated that the mortality rate reduced by half during the study period.[32] Similar trends have also been demonstrated in Northern India.[31]

Studies conducted on patients with severe scrub typhus have identified leucocytosis, raised transaminases, thrombocytopenia, abnormal chest x-rays and raised serum creatinine levels to be associated with worse prognosis.[4] Our study demonstrated a statistically significant association between thrombocytopenia and raised transaminases with severe disease. Similar findings were observed by Kamath et. al.[20] However, they found a significant association between CRP levels and total leucocyte counts in severe cases, which was not observed in our study.

Additionally, no significant association was found between gender, clinical presentation, serum creatinine levels and disease severity. Though our study recorded more female patients with scrub typhus, this gender difference was not noted in cases of severe scrub typhus. Consistent findings were observed by Devamani et al., who demonstrated similar numbers of admissions for severe scrub typhus among both the genders.[33] Length of hospital stay was found to be marginally longer in severe cases (7.2 ± 2.51 days versus 6.67 ± 2.40 days), although this did not reach statistical significance ($p = 0.5685$). No significant association was found between variations in total leukocyte count and disease severity.

Limitations: Our study was limited by being a single-centre hospital-based study with a small sample size, restricting the generalizability of the study to the general population. Community-based seroprevalence studies should be conducted to estimate the true burden of the disease, as hospital-based studies will fail to include the asymptomatic

and the mild self-limiting cases. Confirmation of scrub typhus was done based on IgM detection using a rapid test. Utilization of tests like micro-immunofluorescence assay or IgM detection by ELISA could have increased the probability of case detection. The absence of molecular confirmation by PCR may have led to underestimation of early infections. Our study was observational in nature, relationships between factors are only associations and causality cannot be determined.

CONCLUSION

Scrub typhus remains an important cause of acute febrile illness in endemic regions. Early clinical suspicion, timely laboratory diagnosis, and prompt initiation of appropriate antibiotic therapy are essential to prevent complications and reduce morbidity. Thrombocytopenia and elevated aminotransferases may serve as useful indicators of severe disease and should prompt close clinical monitoring.

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