



Original Research Article

Scrub typhus among patients with acute febrile illness in a tertiary health care centre

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ABSTRACT

Introduction: Scrub typhus, caused by *Orientia tsutsugamushi* and transmitted by bite of larval trombiculid mite of the *Leptotrombidium* genus and is a vector borne zoonotic disease. It has been predominantly reported from Southeast Asia, the Asian Pacific Rim, and Australia. The incidence of this disease is increased in India. These patients show an acute undifferentiated febrile illness and laboratory confirmation is essential. Delay in diagnosis may be fatal.

Aim: To assess the Scrub typhus burden among acute febrile illness patients.

Materials and Methods: This Cross-sectional study, conducted in Dept. of Microbiology, Basaveshwara Medical College & Hospital, Chitradurga, Karnataka, India. Study duration was from August 2020 to January 2021. In this study, a total of 100 febrile illness patients were involved. Among them, 66 were males and 34 females. Under aseptic conditions, venous blood samples were collected from all subjects. Serum was separated by centrifugation, aliquoted, and stored at -20°C for further testing. The serum sample was tested for scrub typhus IgM ELISA using the INBIOS kit. Samples were also checked for dengue fever, typhoid fever, leptospirosis, and malaria. The serum samples that tested positive for any other infectious disease mentioned above (with or without detectable rickettsial antibodies) were excluded from the study. Data was represented in numbers and percentages.

Results: In this study, out of 100 samples 30 were seropositive. Of the 30 seropositive scrub typhus cases, women were 11 (37%) and men were 19 (63%), suggesting that seropositivity was more in men than women. Among the seropositive cases, maximum number of the cases were in 16-30 years (33%) of age, followed by 31–45 years (23%). In this study, more number of positive cases 17 (56.6%) were found during the post-monsoon season i.e., October and November 2020. Fever, the most common symptom (100%). Headache, reported in (70 %) of cases, myalgia (40%), abdominal pain (37%), cough (23%), vomiting (20%), lymphadenopathy (17%), rashes (13%), hepato-splenomegaly (10%), eschar (3%).

Conclusion: The study results may conclude that Scrub typhus seropositivity rate was higher in males than females and also to be included in differential diagnosis of fever of unknown origin.

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1. Introduction

Globally, Rickettsial infections are increasing and is caused by *Orientia tsutsugamushi*, route of transmission by bite of trombiculid mites. Scrub typhus is a zoonotic disease.

The presentation of Scrub typhus may vary from a simple acute febrile illness to one with multiorgan dysfunction with significant morbidity and mortality. Therefore, it needs early laboratory diagnosis.¹ The disease is endemic in geographical region known as 'tsutsugamushi triangle' which includes Southeast Asia, Asia Pacific Rim and Northern Australia.²

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Burden of these infections were neglected in India due to the wide range of non-specific symptoms, less suspicion by the clinicians, lack of community-based studies and non-availability of specific diagnostic tests.³ However, rickettsiosis has been reported in India from Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Assam, West Bengal, Kerala and Tamil Nadu etc.⁴

Clinical presentation of Scrub typhus includes non-specific febrile illness along with headache, myalgia, occasional rash, commonly associated with gastrointestinal, respiratory, or CNS symptoms, which can cause multi-organ dysfunction in untreated cases. Different clinical presentation of this disease is due to differences in the infecting strains.^{5,6} Risk factors include low socioeconomic status, and poor hygienic practices. This study was aimed to assess Scrub typhus burden among acute febrile illness patients.

2. Materials and Methods

This cross-sectional study, conducted in Department of Microbiology, Basaveshwara Medical College & Hospital, Chitradurga, Karnataka, India. The study duration was from August 2020 to January 2021. The study as been approved by the Institutional Ethics Committee (Ref. No: BMC&H/IEC/ 2020 – 2021/ 83) and informed consent was obtained from all the study participants. Demographic, physical and clinical details were obtained from all the study participants. Patients presenting with fever for ≥ 7 days of all age groups attending Basaveshwara Medical College & Hospital were included. Exclusion criteria as follows: Patients with acute febrile illness diagnosed with other infections such as dengue, leptospirosis, typhoid, brucellosis and malaria.

Under aseptic conditions, venous blood samples were collected from all subjects. Serum was separated by centrifugation, aliquoted, and stored at -20°C till further analysis. The serum sample was tested for scrub typhus IgM ELISA using the INBIOS kit. Samples were also checked for dengue fever, typhoid fever, leptospirosis, and malaria. The serum samples that tested positive for any other infectious disease mentioned above (with or without detectable rickettsial antibodies) were excluded from the study. Data was represented in numbers and percentages.

3. Results

In this study, out of 100 patients, 30 (30%) were scrub typhus positive whereas 70 (70%) were negative.

3.1. Distribution of cases according to gender

In this study, among the 100 cases, 66 (66%) were men and 34 (34%) were women. Of the 30 seropositive cases, women were 11 (37%) and men were 19 (63%), suggesting that seropositivity was more in men than women [Table 1].

Table 1: Distribution of cases according to gender

Sex	No. of Positives (%)
Male	19 (63%)
Female	11 (37%)
Total	30 (100%)

3.2. Distribution of cases according to age

In current study, among seropositive cases, maximum number of the cases were 16-30 years (33%) of age group followed by 31-45 years (23%). The prevalence of scrub typhus was found least, (13%) among the age group of 0-15 years and 46-59 years (13%) age group [Table 2].

Table 2: Distribution of cases according to age

Age group (years)	Positive Cases	Percentage
0 – 15	4	13
16 – 30	10	33
31 – 45	7	23
46 – 59	4	13
≥ 60	5	17

3.3. Distribution of cases according to month

In this study, during the post- monsoon season i.e., October and November 2020, highest number of positive cases 17 (56.6%) were found [Figure 1].

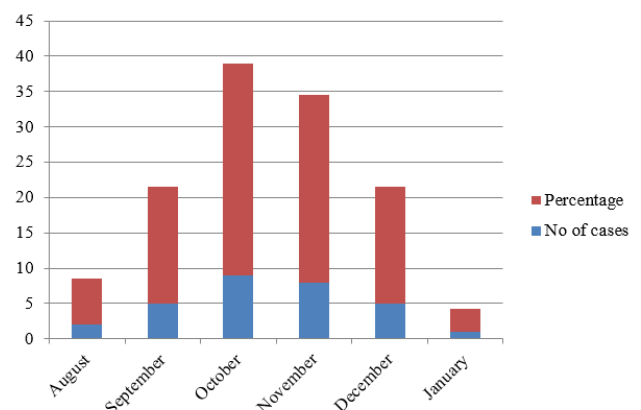


Figure 1: Distribution of cases according to month

3.4. Spectrum of clinical manifestation

The most common symptoms was fever (100%). Headache was reported in (70 %) of cases, myalgia (40%), abdominal pain (37%), cough (23%), vomiting (20%), lymphadenopathy (17%), rashes (13%), hepatosplenomegaly (10%), eschar (3%) [Table 3].

Table 3: Clinical presentations of cases

Clinical features	No. of patients	Percentage (%)
Headache	21	70
Myalgia	12	40
Vomiting	6	20
Rashes	4	13
Abdominal pain	11	37
Cough	7	23
Lymphadenopathy	5	17
Hepato-splenomegaly	3	10
Eschar	1	3

4. Discussion

Scrub typhus, most under diagnosed acute febrile illness. An average of 1 million cases are diagnosed every year and prevalence around the world varies from 0-8% to 60%, and the prevalence being higher among the developing countries.⁷

In this, 30% patients tested were found positive for scrub typhus fever by IgM ELISA. Recently, outbreaks of scrub typhus reported in parts of South India such as Pondicherry.⁸ A study conducted in Andhra Pradesh, recorded a 39% seroprevalence of scrub typhus.¹ Another study from Tamil Nadu observed 31.8% seropositivity.⁹ But in another study from Southern part of Kerala, screened 1268 patients for scrub typhus, reported 217(17.1%) were positive for scrub typhus¹⁰. In a similar study by Garima Mittal et al., conducted a study involving 2547 adult patients with fever 14.4% were found seropositive for scrub typhus.¹¹ In another study from Utter Pradesh, 25.5% of the patients with Pyrexia of unknown origin (PUO) were diagnosed positive for scrub typhus fever by IgM ELISA. Therefore, various studies reported different prevalence rates of scrub typhus, but still it must be included as a differential diagnosis for PUO.

In our study, 63% of the patients that tested positive for scrub typhus were males and 37% females [Table 1], shows significant difference between males and females. The results of our study were in accordance with the results of a study conducted by Gurung et al., they studied 204 patients with fever of unknown origin, among these 63 were confirmed seropositive for scrub typhus, of these 42 were males and 21 were females.¹²

Considering the age profile, maximum positive cases (33%) were found in 16-30 years of age, followed by 31-45 years. V Rajagopal et al., reported that highest percentage of seropositive cases in 16-25 years of age group, which is similar to our study.¹³ However, a few studies reported, higher prevalence in the age group of ≥40 years.^{9,14,15} This high prevalence could be due to their involvement in outdoor occupational activities, hence prone to more exposure to scrub vegetation and bite of mites, thus increases the risk of the disease.

In this study, most of the cases of scrub typhus 17/30 (56.6%) were reported in October & November, that is during the monsoon and post monsoon season. Similarly, studies by Trowbridge P et al., and Ragini S et al., also reported high cases during September to December and maximum in October.^{9,15} Garima Mittal et al., and Vivek Kumar et al., also reported increased incidence of scrub typhus following rainy season.^{13,16} Increased prevalence during these seasons may be due to breeding of mites during the rainy season.

Scrub typhus presents with a wide spectrum of clinical manifestations. Headache, the most common presenting clinical feature in our area (70%), followed by myalgia (40%), abdominal pain (37%), cough (23%), vomiting (20%). Eschar was seen in one patient only (3%). The clinical features in our study are comparable to those of other recent published studies from India.^{17–19}

5. Conclusion

The study results may conclude that Scrub typhus seropositivity rate was higher in males than females and Scrub typhus must also be included in the differential diagnosis of fever of unknown origin. Public health education regarding the disease, the mode of transmission, preventive measures to be taken must be spread among the general population.

6. Conflict of Interest

The authors declare that there are no conflicts of interest.

7. Source of Funding

None.

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