

A Prospective Analysis of Seroprevalence and Demographic Profile of Scrub Typhus in a Tertiary Care Hospital of South Eastern Assam

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ABSTRACT

Introduction: Scrub typhus is a febrile illness caused by *Orientia tsutsugamushi* which is transmitted by the larval stages of trombiculid mites. It is a *Rickettsial* disease and considered some of the most covert emerging and re-emerging diseases and being increasingly recognized in India. This study is being undertaken to know the sero-prevalence among clinically suspected cases of Scrub typhus and its association with demographic patterns.

Methods: A prospective cross sectional hospital based study was carried out on consecutive non repetitive clinically suspected cases of Scrub typhus and acute undifferentiated febrile illness suspected of Scrub Typhus and tested for Scrub typhus IgM antibodies by ELISA method. A total of 70 serum samples were analysed and their results recorded and their demographic characteristics studied.

Results: Out of the 70 serum samples analysed, 14 samples had their OD value above the cutoff value of 0.5. The prevalence was hence found to be 20%. The presenting features of the patients were pyrexia, headache, nausea vomiting, abdominal pain, cough, myalgia, altered sensorium. One of the patients presented with eschar. Mean age was found to be 20-29 years (21% of total positive). There was female preponderance over males. The patients belonged to rural population.

Conclusion: The non specific symptoms make diagnosis of Scrub typhus difficult. Therefore the study concludes that it is recommended to include it is the differential diagnosis of acute febrile illness in this region

Keywords: Scrub typhus, seroprevalence, demographic profile.

INTRODUCTION

Scrub typhus is also known as tsutsugamushi disease. ⁽¹⁾ It is acute febrile illness caused by *Orientia tsutsugamushi* [Japanese meaning for tsutsuga ('dangerous'), mushi ('bug')]. ⁽¹⁾ It is a small Gram negative obligate intracellular organism whose polysaccharides have an antigenic relationship to Proteus OX-K which is therefore used to confirm scrub typhus by serologic diagnosis. *Orientia tsutsugamushi* is transmitted to humans by bite of the larva of trombiculid mites (chiggers) which are microscopic, often brilliantly coloured (red). ⁽¹⁾ Infected chiggers are usually found in areas of heavy scrub vegetation during the wet season (therefore the disease has been called river /flood fever) when mite lays eggs usually June through November. ⁽²⁾ A part of the world where Scrub typhus is endemic is known as Tsutsugamushi triangle. It extends from Japan, Taiwan, China, South Korea, Nepal, Northern Pakistan, Papua new Guinea and Australian states of Queensland and Northern New South Wales. ⁽³⁾ South eastern region of Assam experiences heavy rainfall and flood every year and hence climate is suitable for breeding of vector mite. During World war II, there was an outbreak of this disease in Assam and in West Bengal, in the 1965 Indo-Pak war and in 1990 and in an unit of an army deployed

at Pakistan border of India. ⁽⁴⁾ These reports are therefore indicative of resurgence of the disease in India. Clinical manifestation are non specific, and they include acute febrile illness , fever , nausea, headache, shortness of breath and myalgia ⁽¹⁾ The aims of this study was to know the seroprevalence of Scrub typhus in clinically suspected cases of Scrub typhus and acute undifferentiated febrile illness and its association with demographic parameters like age, gender, geographic location.

MATERIALS AND METHODS

A prospective cross sectional hospital based study was conducted among hospitalised patients of acute febrile illness and suspected cases of scrub typhus in Silchar Medical College for 9 months starting from January 2017-September 2017. Single blood samples were collected from the hospitalized patients. The IgM antibody to *Orientia tsutsugamushi* was detected using Scrub typhus detect Kit, In bios International USA and the optical density was measured by ELISA reader with optical density >0.5 being considered positive. Cut off value was calculated for this particular region by running ELISA for serum samples of normal healthy adults, confirmed scrub typhus and unrelated febrile disease specimen. It was found to be 0.5. Written informed consent was obtained for each patient prior to the enrollment of study. A thorough history was taken regarding the demographic profile of the patients who consented to the study. The study was approved by institutional review board of Silchar Medical College and Hospital.

RESULTS

Among the total 70 patients of acute undifferentiated fever and suspected scrub typhus cases, 14 were positive for IgM antibodies. A female preponderance was seen in the positive cases.

The clinical characteristics of the patients were as follows. Fever was present in 100% cases. Next common symptom was

headache (73%), myalgia (64%) and nausea vomiting (61.29%) and altered sensorium (43%).

Table 1: Association of socio demographic variables and Enzyme linked immunosorbent assay report (ELISA)

Variables	Elisa report positive
Sex	
Male	3(21.5%)
Female	11(78.5%)
Age group	
11-20	2(14.28%)
21-30	4(27%)
31-40	2(14.28%)
41-50	2(14.28%)
51-60	1(7.14%)
61-70	1(7.14%)
71-and above	2(14.28%)
Occupation	
Housewife	4(28.3%)
Daily wages	3(26%)
Student	3(26%)
Farmer	3(26%)
Business	1(15%)
Residential location	
Rural	11(76.2%)
Urban	3(24.8%)

Table 2: Clinical characteristics seen in Scrub typhus cases (n=14)

Clinical characteristics	Number (%)
Fever	14(100%)
Headache	10(73%)
Myalgia	9 (64%)
Nausea vomiting	8 (61.29%)
Altered sensorium	6 (43%)

On examination abdominal pain and hepatosplenomegaly was present in 13.71%. One diagnosed case present with eschar (7.14%) which is pathognomonic.

DISCUSSION

A total of 70 patients suspected of having scrub typhus and acute undifferentiated fever were included in this study to detect the presence of IgM antibody by ELISA. The prevalence of scrub typhus was found to be 20%. It was concordant to studies conducted in Upper Assam by Medhi et al ⁽⁵⁾ (15.46%) and by Khan et al ⁽⁶⁾ in Uttarakhand (19.4%). Some studies conducted in other parts of the country showed a higher prevalence. Studies by Munilakshmi et al (41.7%), ⁽⁷⁾ Ramyashree et al ⁽⁸⁾ (34%) from Andhra Pradesh, Narvencar ⁽⁹⁾ et al from Goa (34%) were therefore discordant with our study.

More female preponderance was similar to studies by Girija et al ⁽¹⁰⁾ and

Bithu et al ⁽¹¹⁾ while a male preponderance was seen in study by Subblaxmi et al. The age of maximum incidence 20-29 years corresponds to study by Medhi et al and Subbalaxmi et al. Fever was the presenting symptom in all diagnosed cases similar to other studies. We couldn't find eschar in most cases (7.14%) which on the contrary was a characteristic finding in other studies by Subbaxmi et al ⁽¹²⁾ and Vivekanandan et al ⁽¹³⁾ (46%).

People residing in rural areas with their house near grasslands and working in the field has higher risk of acquiring Scrub typhus which was seen in our study. The limitations of our study were being a hospital based study does not appropriately reflect the actual prevalence in the region. Other limitations were having a small sample size. Also IgM ELISA is less sensitive compared to Indirect Immunofluorescence assay which is considered the gold standard in diagnosis.

CONCLUSION

Scrub typhus is an important public health problem in tropical countries like ours. This study found a seroprevalence of 20%. Acute febrile illness patients must be investigated for scrub typhus along with other similar type of infections and clinicians should be aware of the disease. The results of the study describe demographic trend and clinical characteristics in scrub typhus. A proper confirmation of the diagnosis, early institution of therapy, public awareness and vector control are important factors to be taken into consideration in the prevention and management of scrub typhus. This study therefore suggests the need to do a more extensive study in this geographic region to determine the prevalence of Scrub typhus for implementing better preventive strategy and proper management of cases.

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