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Study Of Clinico-Demographic Profile Of Scrub Typhus At A Tertiary Care Hospital In West Bengal, India

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Abstract
Background:
Diagnosis of scrub typhus is challenging due to similarity of early symptoms with other locally prevalent febrile illnesses, as well as scarcity of rapid, reliable and cost-effective standardized methods. This study was carried out to document the clinical presentation and outcomes of scrub typhus patients, admitted in a tertiary care hospital in eastern india. Our study aims to understand variations of disease frequency, its age and sex distribution and explores the range of clinical features.
Aims and objectives:
To study the clinico- demographic profile of scrub typhus at a tertiary care hospital in west bengal, india over a period of one year.
Materials and methods:
This observational study was performed based on 1 year data available from retrospective hospital records, of all febrile inpatients with history of more than 5 days fever, irrespective of age and sex, having tested reactive for serum anti scrub typhus igm. The clinical and laboratory data were collected from record files of all the patients, investigated for scrub typhus.
Results:
Among 2018 febrile patients, 248 were found to be seropositive for scrub typhus. Most of the patients belonged to the toddler age range with male preponderance. Maximum cases were detected between the month of october and november. Along with varied clinical features, eschar was observed in 3.2% cases. Complications noted were meningoencephalitis and respiratory complications among younger patients whereas sepsis and ards among adults. Mortality rate being 2.8%.
Conclusion:
Escalated suspicion specially in cases of unexplained fever, knowledge about geographical distribution and clinical manifestations are important for timely diagnosis, proper treatment and favourable outcome. This study can provide guidance to primary care physicians, for early diagnosis and treatment of scrub typhus.
Keywords: *Scrub typhus; orientia tsutsugamushi; fever; eschar; meningoencephalitis*

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I. Introduction

The most common presenting complaint in the emergency and outpatient clinics in developing countries is Acute febrile illness (AFI). Rainy and post-rainy season in India witnesses a surge in cases of AFI. Malaria, dengue, typhoid, scrub typhus, and several viral infections have been classically responsible for such outbreaks. [1]

Scrub typhus, a zoonotic vector borne disease caused by the obligate intracellular gram negative bacterium *Orientia tsutsugamushi*. The vector responsible for the disease transmission are the chigger mites of the family Trombiculidae of genus Leptotrombidium.[2] The rural and hilly regions of the "tsutsugamushi triangle", which extends from northeast Asia to Papua New Guinea and northern Australia in the southeast, Pakistan and Afghanistan in the northwest, and the Maldives and Réunion Islands in the southwest, is endemic for scrub typhus with around 2 million of the population at risk.[3–5]. Scrub Typhus has become endemic and one of the commonest causes of Acute Febrile Illness in India.[6] Among 28 states in India, 23 have reported the presence of scrub typhus.[7–9] In past 4 to 5 years, an upsurge of cases has been noticed in certain areas of West Bengal, an eastern state in India.

Scrub typhus fever has a incubation period of 6-21days, accompanied with headache and myalgia. Other characteristics features are maculopapular rash, cough, gastrointestinal symptoms, lymphadenopathy, hepatomegaly, splenomegaly, thrombocytopenia and capillary leak syndrome. Patients develop a characteristic necrotic eschar at the site of the mite bite. The clinical manifestations vary from subclinical and selflimiting disease to severe multiorgan failure and death.

Scrub typhus is underdiagnosed in India due to its non-specific clinical presentation, limited awareness and low index of suspicion among clinicians. The diagnosis of the disease is very challenging due to similarity of its early symptoms with other locally prevalent febrile illnesses, as well as scarcity of rapid, reliable and cost-effective standardized methods. Early diagnosis and specific treatment will reduce morbidity and mortality from this infectious disease. This study was carried out to document the clinical presentation and outcomes of patients, diagnosed with scrub typhus admitted in our tertiary care hospital in eastern India. By examining medical records of admitted Scrub typhus, our study aims to understand variations of disease frequency, its age and sex distribution and explores the range of clinical features that characterize the disease.

II. Aims And Objectives:

To study the clinico- demographic profile of scrub typhus at a tertiary care hospital in West Bengal, India over a period of one year.

III. Material And Methods:

This observational study was performed based on 1 year data available from retrospective hospital records, from July 2022 to June 2023 at a tertiary care hospital in Malda, West Bengal, India. Approval was taken from the Institutional Ethics Committee, [Certificate Reference Number: P/MLD-MC/IEC-23/120 Dated: 25.08.2023].

Data from hospital records of all febrile inpatients with history of more than 5 days sudden onset fever, irrespective of age and sex, having tested reactive for serum Anti Scrub typhus IgM were included in the study.

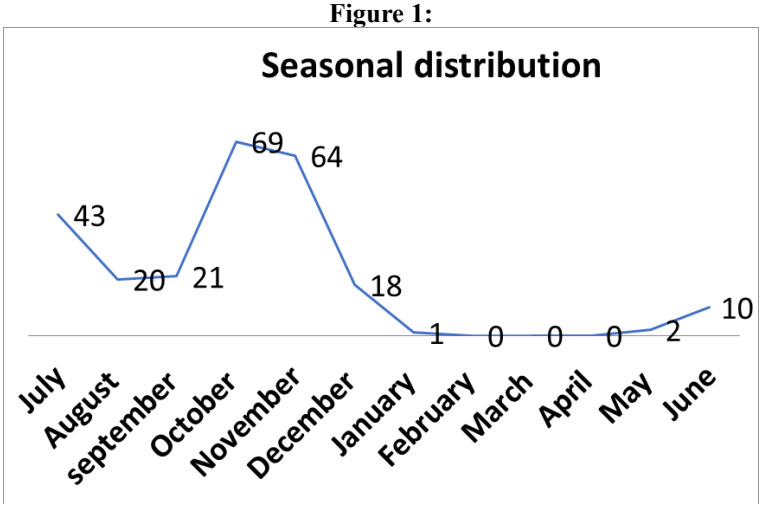
Qualitative data was analysed by frequency and proportion. The clinical and laboratory data were collected from record files of all the patients, investigated for scrub typhus.

The included test results were an outcome of standard procedure where 5ml of blood was collected and was kept at room temperature and then centrifuged at 3000 rpm for 5 minutes and serum separated. Serum samples were tested for IgM antibodies against scrub typhus (*Orientia tsutsugamushi*) by ELISA following the manufacturer's instructions provided in the Scrub Typhus *Detect* IgM ELISA Kit [STMS-1 LOT- CK6133].

IV. Results:

As per the standard records , 2018 clinically suspected patients were tested for scrub typhus. Out of 2018 febrile patients, 248 (12.28%) were reactive for scrub typhus IgM antibody. Maximum numbers of seropositive cases were detected in the post monsoon period, between the month of October (69; 27.82%) and November (64; 25.80%), with few sporadic cases throughout the year. [Fig 1]

Figure 1:



Most patients belonged to 1-3 years age group [Fig 4]. Male (140; 56.45%) patients are more affected than female (108; 43.55%) [Fig 2]. Most belong to rural areas(223; 89.91%) compared to urban areas(25; 10.08%) [Fig 3]. Most of the affected patients from rural areas had history of exposure to various risk factors like handling and proximity to domestic animals, use of cow dung or wood as fuel, living close to agricultural land, crop fields, vegetations and wood piles. As per records, poor personal hygiene like open field defaecation was also followed by many affected individuals.

Table 1:

Demographic Distribution Of Patients

VARIABLES	NO. OF SCRUB TYPHUS CASES	PERCENTAGE
SEX		
MALE	140	56.45%
FEMALE	108	43.55%
TOTAL	248(n=248)	100%
AGE (years)		
<1	14	5.65%
1-3	90	36.29%
4-6	59	23.79%
7-9	43	17.34%
10-12	16	6.45%
13-15	3	1.21%
16-18	1	0.40%
19-40	15	6.05%
41-60	6	2.42%
>60	1	0.40%
TOTAL	248(n=248)	100%
AREA DISTRIBUTION		
RURAL	223	89.91%
URBAN	25	10.09%
TOTAL	248(n=248)	100%

Figure 2: Gender Distribution

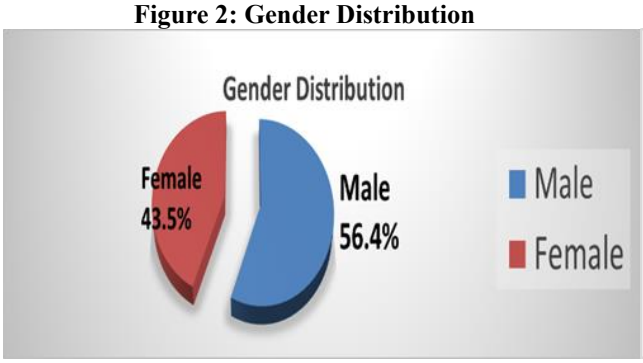


Figure 3: Area Distribution

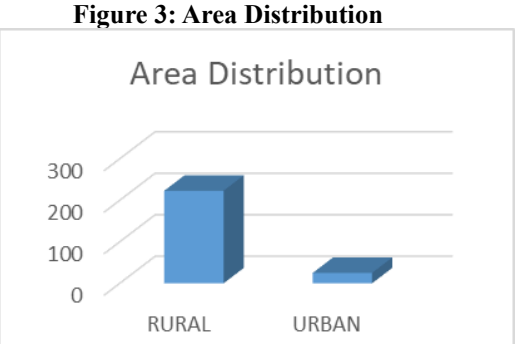
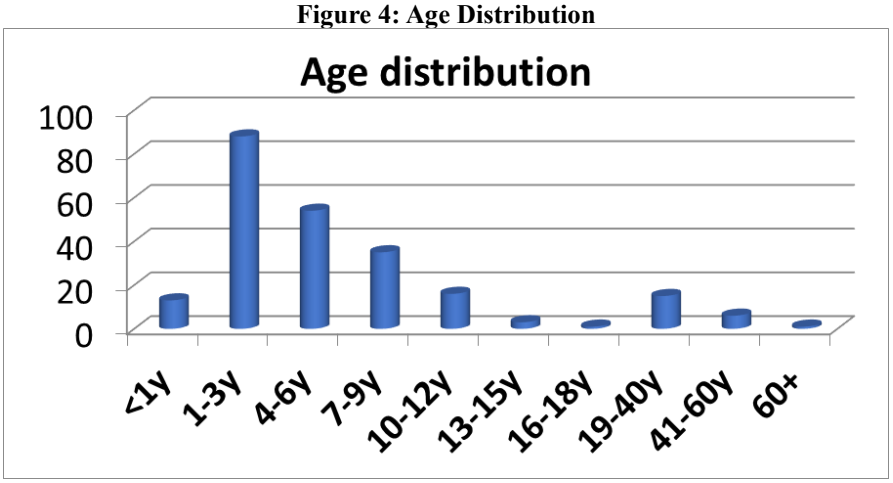


Figure 4: Age Distribution

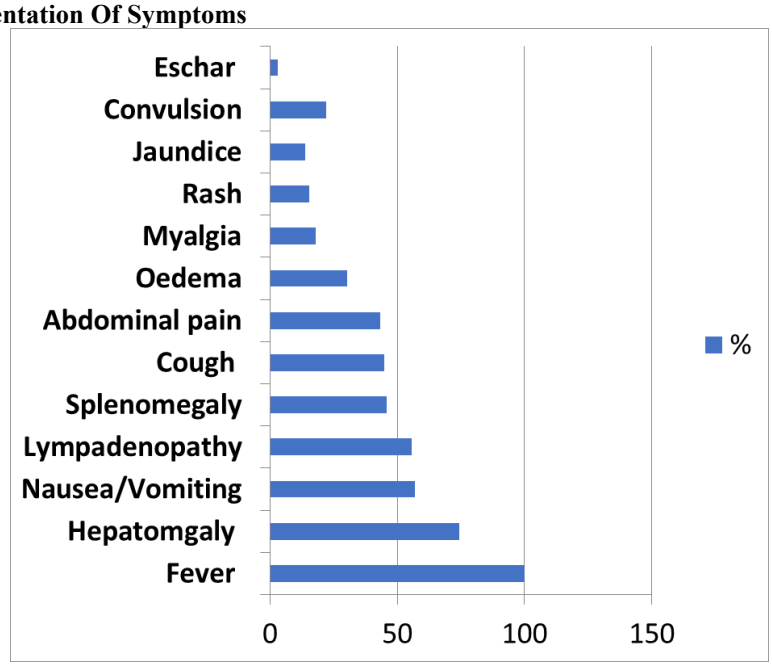


The following table [Table 2] and the graphical representation [Fig 5] depicts the common clinical presentations among Scrub Typhus affected individuals. Hepatomegaly tops the list of presenting clinical features being reported by 74.2% patients. Nausea and vomiting (56.9%), abdominal pain (43.2%), cough (44.3%), splenomegaly (45.5%), lymphadenopathy (55.6%), rash (15.7%), convulsion (22.1%) and jaundice (13.9%) were other presenting clinical features in our study. Eschar was observed only in 8 patients (3.2%).

Table 2:
Clinical Presentations Of Scrub Typhus Among Studied Febrile Individuals

Clinical Presentations	Numbers(%)
Hepatomegaly	184(74.2)
Nausea/ Vomiting	141(56.9)
Lymphadenopathy	138(55.6)
Splenomegaly	113(45.5)
Cough	110(44.3)
Abdominal Pain	107(43.2)
Oedema	74(30.2)
Myalgia	45(18.1)
Rash	39(15.7)
Jaundice	35(13.9)
Convulsion	55(22.1)
Eschar	8(3.2)

Figure 5:
Graphical Representation Of Symptoms



Following picture shows Eschar in groin region of a two-year-old child.

Eschar

Injection Ceftriaxone was given to all patients till confirmatory serology reports were available. Oral Doxycycline being the drug of choice for Scrub typhus, all the adult patients and children above the age of one year were treated with Doxycycline; dosage being in case of adult 100mg twice daily for 7 days and in case of children 5mg/Kg body weight/day for 7 days. Children under 1 year age were treated with Azithromycin; 100mg/Kg body weight/day.

We encountered certain complications among both the paediatric and adult patients. Meningoencephalitis was the most common complication reported in approximately 30% (66) patients of less than equal to 12 years age. Respiratory complications viz Pneumonia, Pleural effusion came second, being reported in approximately 15% (33) patients. We could revive most of the patients but unfortunately 4 patients, less than 1 year of age succumbed. The reason behind deduced are delayed presentation and poor response to Azithromycin.

However, complications found in patients of more than 12 years age were different. Sepsis being the most common complication reported in approximately 42% (11) patients followed by ARDS among approximately 30% (8) patients with 3 casualties. The mortality rate in this study was 2.8% as compared to studies conducted by Kamarasu et al(15%) and Deepak Jain et al(18%).[27,28]

V. Discussion:

Scrub Typhus is emerging life threatening infectious disease in India, which is caused by *Orientia tsutsugamushi*. Many outbreaks have been reported from several parts of the country [11]. In India the disease has occurred among troops duing World War II in Assam and West Bengal. Presently scrub typhus is enjoying a pan India spread particulary from south India and Himalayan regions of north India[12]. Outbreaks can be seen in sub-Himalayan north India, Central India and Eastern India.

In our study out of 2018 febrile patients, 248(12.28%) were found to be seropositive for scrub typhus. Most of the patients belonged to the toddler age range (1-3 years; 36.29%). The observation corroborated with findings from other studies where paediatric population was mostly affected [16,18,21,22]. The reason behind we presume, paediatric behavioural patterns and activities leading to increased exposure and contact with the chigger mites that transmit scrub typhus.

We found a male preponderance (140; 56.45%) with female not lagging much behind (108; 43.55%), though another study by Zainab et al., reported female predominance[13]. Concentration of cases were more seen in rural areas (223;89.91%). However urban areas in our study commanded some share (25; 10.09%). The disease is slowly becoming urbanized, worldwide and may not be considered as a problem restricted to rural areas[14,15].

Our findings showed maximum numbers of seropositive cases were detected in the post monsoon period, between the month of October (69; 27.82%) and November (64; 25.80%) attributed to substantial rainfall and relative humidity, with few sporadic cases throughout the year. Such an early winter upsurge of cases can be explained by increased human activities in the agricultural fields and bushes during these periods. Secondly, during the early winter phase [September to early months of following year], there is growth of secondary scrub vegetation, which is the habitat for trombiculid mites (mite islands) [25]. Other authors reporting similar seasonal variations were found[16,17,18]. Majority of the cases, reported by Zainab et al., and Naveen et al. were between June and November[13,19].

Most of our clinical findings corroborated with other similar studies. Clinical symptoms and signs were varied with Hepatomegaly leading, been reported by 74.2% patients. Splenomegaly was found in 45.5% patients. In one study the authors reported 80% hepatosplenomegaly [16].

Nausea, vomiting and abdominal pain were reported by 56.9% and 43.2% patients respectively. 44.3% patient developed cough. Study conducted by Palanivel et al. reported 59% and 73% patients to have abdominal symptoms and cough respectively[16].

Our study findings showed Lymphadenopathy among 55.6% patients, whereas some other study got Lymphadenopathy among 11% patients [6].
Convulsion (22.1%) and jaundice (13.9%) were other presenting clinical features in our study.

This study observed rash in 15.7% patients whereas 36% patient presenting with rash has been reported in one study [18]. Eschar was observed only in 8 patients (3.2%). It be explained by the fact that as all patient of this study are residents of tropical country having dark complexion, rashes and eschar can be missed out easily without proper orientation. However, studies conducted by Zainab et al. and Bal et al., reported eschar in 17.9% and 20% cases respectively [13,20]. In a study conducted by Kishore et al., rash was reported in 14.63% cases [21]. Zainab et al.reported rash in 30% cases[13], whereas some other authors reported neither rash nor eschar [22]. Rickettsial infection gets highly suggested with presence of an eschar[23]. However, variable presence of eschars in patients of scrub typhus range between 7–97%, as reported in studies throughout the endemic regions[24]. Differences in geographic distribution of various genotypes of O. tsutsugamushi or an insufficient physical examination may explain an absence of eschar[24]. There are only few case reports of multiple eschars in patients with scrub typhus infection [24].

Focussing on sequelae and outcome, our study recorded meningoencephalitis (30%) and respiratory complications (15%) among younger patients whereas sepsis(42%) and ARDS(30%) among adults. Mortality rate being 2.8%. However, a systematic review on the burden of Scrub typhus in India, done by Emily Devasagayam et al showed somewhat varying picture from the last decade. This article showed which 17.4% of cases had multiple organ dysfunction syndromes, 20.4% patients required ICU admission, and 19.1% needed ventilation. The overall case-fatality rate was 6.3%, and the mortality among those with multi-organ dysfunction syndrome was as high as 38.9%.[26]

VI. Conclusion

A reemerging disease, Scrub typhus is prevalent in India and threatens serious complications. High degree of seropositivity was found in our study specially among children. Excellent response to Doxycycline proves prevalence of wild sensitive pathogenic strains in the catchment area whereas poor response to Azithromycin may be due to non-judicious use of this drug in Acute respiratory infections. Escalated suspicion specially in cases of unexplained fever, knowledge about geographical distribution and clinical manifestations are important for timely diagnosis, proper treatment and favourable outcome. This study can provide guidance to primary care physicians, for early diagnosis and treatment of scrub typhus. It can also emphasize the need to enforce proper personal hygiene irrespective of age and gender variation. Surely in a tropical, developing country like India, such guidance can ensure a crucial role in preventing this grave clinical entity from transforming into a serious public health concern.

Conflicts of Interest: None

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