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Original Article

SEROPREVALENCE AND CLINICAL FEATURES OF SCRUB TYPHUS AMONG FEBRILE PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: Rickettsial infections is the most neglected and underdiagnosed tropical diseases in developing countries. The most common rickettsial disease, which is caused by the obligate intracellular gram-negative bacteria Orientia tsutsugamushi, is Scrub Typhus. Scrub typhus can prove to an important diagnosis in pyrexia of unknown origin (PUO) patients and is transmitted by a species of trombiculid mites ("chiggers"). Aim of this study is to find seroprevalence and clinical features of scrub typhus among febrile patients from a tertiary care hospital in North India.

Methods: This study was undertaken for a period of 1 y. All the patients attending the outpatient department or admitted indoors suspected of PUO were included in the study. Serum samples of suspected cases were tested for IgM Scrub typhus.

Results: During the study period, a total of 755 cases were tested for scrub typhus, out of which 223 were positive so, the seroprevlance of Scrub typhus is 29.5%. Out of 223 positive patients, 105 (47%) were males and 118 (53%) were females. Maximum no. of patients was from age group 21 to 40 y of age and maximum number of cases is in autumn season. Most common clinical feature is fever, followed by myalgia, headache, ocular pain, dyspnoea, cough and eschar, respectively.

Conclusion: Scrub typhus is an emerging tropical rickettsial disease in the Indian subcontinent. The present study highlights the importance of screening of PUO cases for Scrub typhus as timely institution of simple empirical treatment can prove to be lifesaving in such cases.

Keywords: Orientia tsutsugamushi, Pyrexia of unknown origin, Rickettsial infection, Scrub typhus, Trombiculid mites

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INTRODUCTION

The most common rickettsial disease, which is caused by the obligate intracellular gram-negative bacteria Orientia tsutsugamushi, is Scrub Typhus [1, 2]. The bite of an infected larval-stage trombiculid mite (chigger) causes Scrub Typhus [3]. The "tsutsugamushi triangle," which includes parts of Northern Australia, South and Southeast Asia, the islands in the Indian and Pacific Oceans, and the Asia-Pacific region, is recognized as the endemic area for the disease [4]. In India, scrub typhus is a public health problem that is frequently disregarded [5]. It can cause up to 70% mortality, with a median mortality of 6.0% [6]. Research from India shows that, depending on the organ involved and comorbidities present, the scrub typhus case fatality rate (CFR) can vary from 1.3% to 33.5% [7-9]. Scrub typhus manifests clinically as eschar, rash, fever, headache, cough, bodily pains, and muscular soreness. Severe symptoms include meningitis, pneumonia, encephalitis, disseminated intravascular coagulation, and multi-organ failure [10-12]. Scrub typhus can be clinically diagnosed with 98.9% accuracy if eschar is present at the mite biting site; however, patient variability in eschar presence ranges from 7 to 97% [13]. Scrub typhus is diagnosed in the laboratory using serological tests such as the Weil-Felix test, indirect immunofluorescence assays, indirect immunoperoxidase assays, enzyme-linked immunosorbent assays (ELISA), immunochromatographic tests (ICT), etc. The IgM-ELISA-based approach is the most accurate serological assay for scrub typhus diagnosis [14]. Scrub typhus shares many clinical signs with other febrile infectious diseases, including dengue virus infections, leptospirosis, and murine typhus. So, early detection and treatment of scrub typhus patients are important to improve the outcome of the disease.

MATERIALS AND METHODS

The current study was aimed to assess the seroprevalence and clinical features among patients diagnosed with PUO in a Tertiary care hospital. Serum samples of suspected cases were tested for IgM Scrub typhus This study was undertaken for a period of 1 y from July 2020 to June 2021 in our tertiary care hospital. Institutional ethics committee (IEC) permission was taken before study. All the patients attending the outpatient department or admitted indoors suspected of pyrexia of unknown origin (PUO) were included in the study. Exclusion criteria was confirmed cases for other febrile illnesses like malaria, typhoid, dengue, chikungunya, leptospirosis, and unavailability of written informed consent.

Serological testing protocol

Five ml of venous blood was collected in a plain vial and serum was separated after centrifugation at 3,000 rpm for 5 min. This serum was used for further testing. Detection of IgM antibodies to Scrub Typhus was performed in all the cases of pyrexia of unknown origin (PUO) by TRUST WELL (ELISA KIT) for confirmation of scrub typhus. Test was carried out as per manufacturer's instructions and optical density (OD) was read at 450 nm. Result interpretation was as follows: Values<0.2 OD units = negative, 0.25–0.5 OD units = equivocal, and 0.5 OD units = positive. Equivocal samples were subjected to repeat testing after 1 w (fig. 1).

Stastical analysis

All data from the investigation were coded and analyzed using SPSS version20. Descriptive statistics such as frequency and percentage of positive Scrub Typhus cases were calculated.

RESULTS

During the study period, a total of 755 cases were tested for scrub typhus, out of which 223 (29.5%) were positive. Out of 223 positive patients for scrub typhus., 105 (47%) were males and 118 (53%) were females.

Maximum no. of patients was from age group 21 to 40 y of age.

Cases from people living in rural area 972%) is more common than in urban area.

The maximum number of cases is in September (35.4%). Maximum clustering of cases seen during the autumn season, starting from September to November, accounting for 80.8% of the total cases.

Most common clinical feature is fever followed by myalgia, headache, ocular pain, dyspnoea cough and eschar respectively.

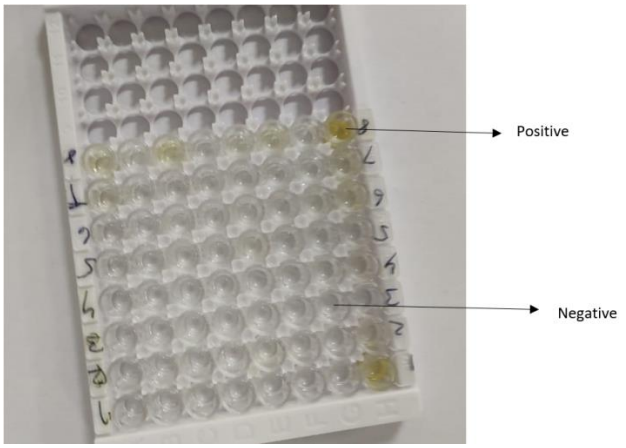

Fig. 1: ELISA plate showing positive and negative result for scrub typhus

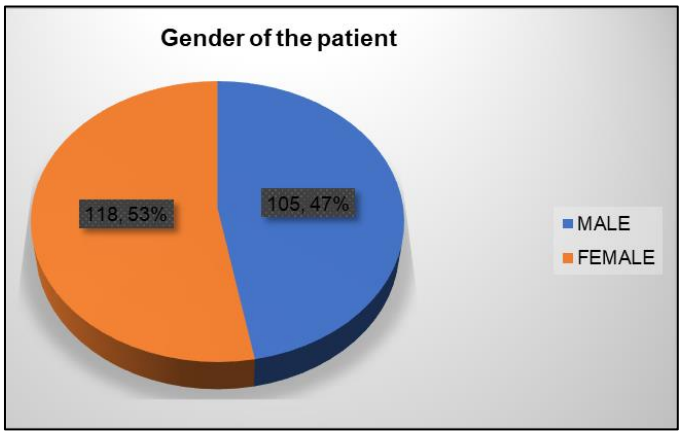

Fig. 2: Distribution of cases according to gender (n=223)

Table 1: Age distribution of positive cases (n=223)

Age	No. of positive cases	Percentage
1-20 y	22	9.9
21-40 y	93	41.7
41-60 y	67	30
61-80 y	41	18.4

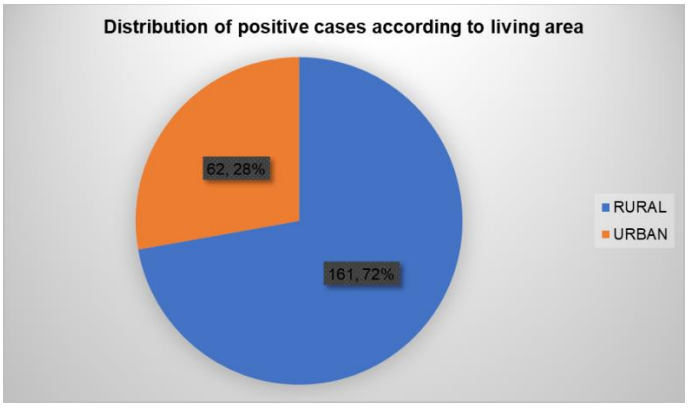

Fig. 3: Distribution of positive cases according to living area (n=223)

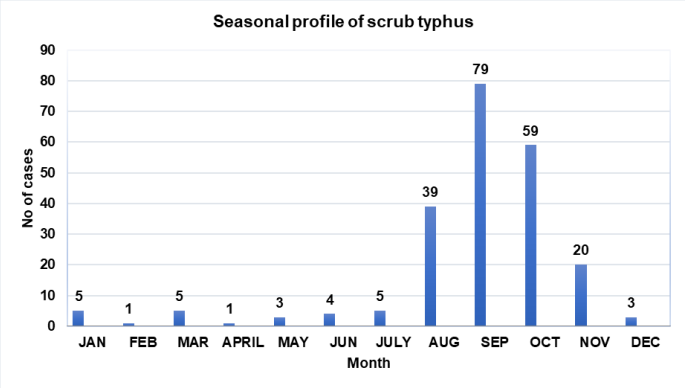

Fig. 4: Seasonal profile of scrub typhus

Table 2: Clinical features of positive patient

Clinical features	No. of cases showing clinical features
Headache	59
Eschar	5
Dyspnoea	23
Myalgia	69
Ocular pain	32
Cough	28

DISCUSSION

The majority of PUO in developing nations like India are caused by scrub typhus, which goes undiagnosed because its clinical symptoms are similar to those of other febrile infectious diseases like murine typhus, leptospirosis, and dengue virus infections. In addition, the lack of appropriate, specific laboratory tests makes scrub typhus even more serious and challenging to treat. For the purpose of diagnosing and treating patients, ELISA for IgM antibodies can prove to be incredibly inexpensive, cost-effective, and selective [15].

In this study, seroprevlance of Scrub typhus is 29.5%. IgM ELISA was used to diagnose scrub typhus fever in 18.6% and 25.5% of the patients in similar studies conducted by Singh S *et al.* [16] and Rizvi *et al.* [17] in northern India. In rural areas, scrub typhus frequency was found to be 14.2% in a different study conducted in southern India [18]. Our study reported maximum clustering of cases seen during the autumn season, starting from September to November, accounting for 80.8% of the total cases. This is because the mites are most active during or at the end of the rainy season. Like in the study by Bithu *et al.* [20], the majority of the patient in this study is from rural area. Various studies also show a predominance of cases in the autumn season [19, 20]. This study shows that females are more affected than males, similar to the study by Vivekananda M. *et al.,* which reported female preponderance [21]. This study reported an age group of 30–60 y to be showing maximal positivity, similar to other studies [20]. The present study revealed fever, myalgia, and headache as the predominant symptoms in Scrub typhus-positive patients. The Lamichhane P *et al.* [22] study shows fever, headache, cough, shortness of breath, nausea, and abdominal pain were the clinical characteristics in decreasing order of occurrence.

CONCLUSION

Scrub typhus has emerged as an important cause of febrile illness in India. It can appear with or without eschar, and its clinical symptoms can vary. So, we conclude that scrub typhus must be included in the differential diagnosis of all cases of FOU (fever of unknown origin). This is particularly important in the autumn and at the end of the rainy season. A high index of suspicion, early diagnosis, and prompt intervention may help in reducing mortality.

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Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICTS OF INTERESTS

Declared none

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