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CLINICAL PROFILE & KNOWLEDGE OF SCRUB TYPHUS AMONG PATIENTS ATTENDING THE TERTIARY CARE HOSPITAL – AN ANALYTICAL STUDY

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Abstract

Introduction: India is a tropical country with a high burden of febrile zoonotic/infectious illnesses, scrub typhus being such a cause with multiple epidemics reported from different regions of the country. Scrub typhus is the commonest of the rickettsial diseases in India and is difficult to diagnose. Pneumonia and acute respiratory distress syndrome (ARDS) are frequent complications.

Objectives: 1. To assess signs and symptoms occurring in scrub typhus among patients attending the hospital. 2. To estimate the knowledge of scrub typhus among patients.

Material & methods: The study was conducted by Department of Microbiology at PMCH Udaipur from January 2024 to March 2024 and screened for scrub typhus were selected as the study sample. The sample size was calculated as 227 using the Daniel's formula. A self-administered semi-structured questionnaire was predesigned and pretested Questionnaire to collect data regarding scrub typhus, which was prepared in English and Hindi for data collection. Statistical packages of social sciences (IBM software, version 27) were used to compare the continuous variables between the two groups. $P<0.05$ will be considered as statistically significant.

Results: The findings of the study revealed that 13.65% of patients were positive for scrub typhus. The most common symptoms among patients were fever (100%), headache (54.18%), nausea/vomiting (23.78%). Out of 227 patients, only 66 (29.07%) had heard about scrub typhus. Among 66 patients, On item wise knowledge, more than half of the patients knew that scrub typhus as infectious disease (50%), transmitted through the bite of mites (59.09%) However, only 16.66% knew that scrub typhus rapidly spread in the rainy season. Occupation is the factor that is significantly associated with scrub typhus at 95% CI, ($\chi^2 = 6.667$, $p = 0.009$) at 5% Los.

Conclusion: Our results highlight that scrub typhus infection is an important cause of AFI, and patients must be routinely screened for the proper diagnosis and timely treatment. Moreover, very few had heard about scrub typhus and its preventive measures, so awareness program on scrub typhus is needed for the risk groups to enhance their knowledge.

1. Introduction

Rickettsial diseases are considered some of the most covert emerging and re-emerging diseases and are being increasingly recognized in India. Among the major groups of rickettsiae, commonly reported diseases in India are scrub typhus, murine flea-borne typhus, Indian tick typhus and Q fever.[1] Scrub typhus is the most common rickettsial infection in the Indian subcontinent. It is caused by Orientia tsutsugamushi. Scrub typhus is endemic in a part of the world known as the Tsutsugamushi triangle (after the name O. tsutsugamushi).[2] It is a zoonotic illness caused after the bite of a trombiculid mite larva carrying Orientia tsutsugamushi, an obligate intracytosolic bacterium. The mites use rodents as hosts.[3]

In India, the reported incidence of Orientia in rodent carriers is very high.[4]It affects people of all age groups, but people working in farmlands and vegetable fields, engaged in harvesting in autumn and other outdoor activities such as picking wild fruit, collecting firewood, and spending leisure activities such as camping, walking, and resting on grassland are at the higher risks for scrub typhus infections.[5]

Scrub typhus patients face multiple signs and symptoms which can range from mild to life-threatening episodes. Onset is usually characterized by high fever, intense generalized headache, diffuses myalgias, eschar or skin ulcer, fatigue, anorexia, rash, and altered mental status.[6-8] Studies have also shown multi-organ dysfunction in terms of bronchopneumonia, toxic hepatitis, acute cholecystitis, toxic myocarditis, heart failure, pleural effusion, emphysema, renal, and central nervous system dysfunction in patients.[6,7,9] These signs and symptoms are non-specific and resemble other infectious diseases such as malaria, enteric fever, dengue, or leptospirosis, so it is difficult to differentiate clinically from other infections.[10]

Pneumonia is one of the most frequent complications of scrub typhus which manifests as a non-productive cough and breathlessness and leads to ARDS which could be life-threatening. Severe complications besides acute respiratory distress syndrome (ARDS) include hepatitis, renal failure, meningo-encephalitis and myocarditis with shock may occur in varying proportions of patients.[11]

Scrub typhus in Rajasthan was first ever reported in Alwar district 2008, with further several cases were reported from 2008 to 2010 on a continuous manner. In Rajsathan, some areas like Kota, Udaipur, Rajsamand, Bhilwara and Banswara districts are provided with favorable geographical areas and climatic conditions like humidity, temperature and shrubby areas to flourish the scrub typhus vector.[12]

Need for the study

Scrub typhus may cause mild symptoms, serious complications, or even death. Mortality may be as high as 21.2% if diagnosis or appropriate therapy is delayed. The goal of this prospective study was to provide a detailed panel of clinical aspects of this disease based on a large patient population, thus helping to create a better clinical and laboratory profile of this re-emerging disease for clinicians to work with.

The main purpose of the study was to determine the signs and symptoms, knowledge of scrub types among patients in a tertiary care hospital of Udaipur (Rajasthan).

With this background the objectives of present study are:

1. To assess signs and symptoms influencing scrub typhus among patients.
2. To estimate the knowledge of scrub typhus among patients.

2. Materials And Methods

Study design

The study followed a facility (Pacific Medical College and Hospitals, Udaipur) based cross-sectional analytical study.

Study setting

The study was conducted by Department of Microbiology at PMCH Udaipur from January 2024 to March 2024 and screened for scrub typhus were selected purposively as the study sample for the study. Informed consent was taken from all the patients who participated in the study.

Study population

Patients of all age groups who were coming to hospital were approached to be included in the study. Those who did not give informed consent or were physically or mentally unfit to answer the questions and/or undergo clinical measurements

Sample size

The prevalence of scrub typhus varies from 0-8% to 60% in different countries.[8] Considering 18% prevalence. The sample size was calculated as 227 using the Daniel's formula[13];

$$n = \frac{Z^2_{1-\alpha/2}\, p(1-p)}{e\text{^}2}$$

Where, Z is 1.96 at 95% confidence level, Margin of Error (E) is 5% (0.05), Prevalence (P) is 18%, q = 1 – p = 0.82. A simple random sample technique was used for the selection of samples.

Data collection

Data collection was done in different departments ward including Tb chest, Medicne, FMW, OBG, HDU, NEURO, NEFRO, GASTRO etc. We used a self administered semi-structured questionnaire was predesigned and pretested Questionnaire to collect data regarding scrub typhus, which was prepared in English and Hindi for data collection. Printed copies of the survey were placed in front of the participants for reference. The questionnaire had three sections:

• Section A: Consisted of questions related to signs & symptoms

• Section B: Comprised of questions based on knowledge on scrub typhus among patients.

Further, patients' blood samples sent for the test by O. tsutsugamushi specific immunoglobulin M enzymelinked immunosorbent assay (IgM ELISA) (Scrub Typhus Detect IgM ELISA kit, Inbios, USA) at the lab of PMCH and interpreted as per the manufacturer's instructions as positive, equivocal, and negative were reviewed. All efforts were made to keep the questions simple and unambiguous according to the objectives of the study. All data will be collected, coded and entered into a secure database by using MS excel. Data were analyzed using SPSS version27. Appropriate tables were prepared and inferences were drawn using Chi-square test.

Data analysis

Qualitative data were tested for normality and accordingly will be expressed as mean ± standard deviation for normally distributed data. Categorical variables were presented in the form of rate, ratio, frequency (percentage). At the end of the study, all the data were compiled systematically and will be analyzed using chi-square test. Statistical packages of social sciences (IBM software, version 27) were used to compare the continuous variables between the two groups. P<0.05 will be considered as statistically significant.

3. Results

A total of 227 patients were recruited for the study.

Table 1: Clinical features of patients diagnosed with scrub typhus

Signs & symptoms	No. of patients	Percent
Fever (<1 week)	22	9.69
Fever (1 to 2 week)	66	29.07
Fever (2 to 3 week)	79	34.80
More than 3 weeks	60	26.43
Headache	123	54.18

Nausea/ vomiting	54	23.78
Weakness	56	24.66
Myalgia	8	3.52
Dizziness	11	4.84
Abdominal pain	74	32.59
Eschar	29	12.77
Lymphadenopathy	41	18.06
Hypotension	36	15.85

Most of the patients had a history of exposure to domestic animals (63.43%), being closest to the forest or bushy area (57.70%), and history of rats infestations (44.49%). Nearly half of them had vegetation around houses (41.40%), and history of visit to forest area(18.50%) [Table 2].

Table 2: Predisposing factors among patients (n = 227)

Predisposing factors	No. of patients	Percent
History of exposure to domestic animals	144	63.43
Home near to forest	131	57.70
Infestation by rats	101	44.49
Vegetation around houses	94	41.40
History of visit to forest	42	18.50

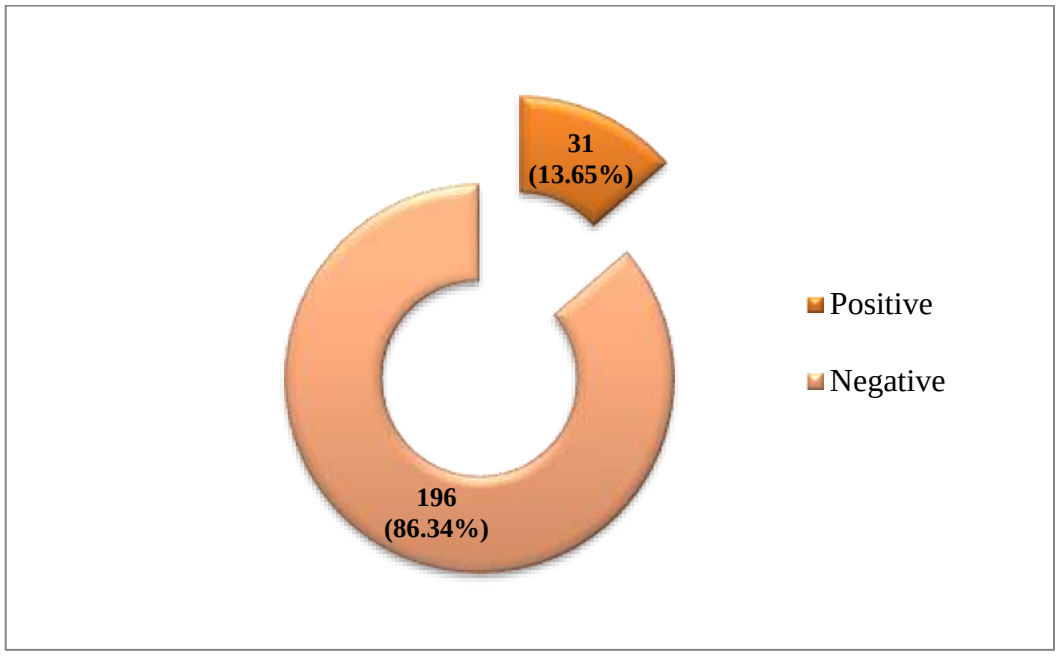

Fig. 1: Prevalence of scrub typhus among patients (n=227)

Out of 227 patients, only 66 (%) had heard about scrub typhus (not shown in table). Among 66 patients, 50% knew scrub typhus as infectious disease, 59.09% knew the mode of transmission through the bite of mite, and 16.66% reported that scrub typhus spreads rapidly during the rainy season. Regarding symptoms, most of the patients reported fever (28.78%) as a symptom of scrub typhus. Regarding the preventive measures, highest percentages of the patients knew that using insects repellents (51.51) were the preventive measures of scrub typhus, while very few using ground covers while sitting (10.0%), and few know that vaccine is not available[Table 3].

Table 3: Knowledge on scrub typhus among patients (n=66)

Knowledge item	No. of patients	Percent
Meaning of scrub typhus as infectious diseases	33	50
Mode of transmission from person to person	39	59.09
Rapidly transmitted in rainy season	11	16.66
Symptoms of scrub typhus	19	28.78
Proper sanitation help to prevent scrub typhus	17	25.75
Using insects repellents prevent scrub typhus	34	51.51
Using ground covers while sitting is another method	6	9.09
Vaccine is not available for scrub typhus	12	18.18

Age shows non-significant results at 95% confidence interval at 5% level of significance (χ^2 = 1.088, p- value = 0.296). Sex also shows non significant association with scrub typhus but occupation shows a highly significant association with scrub typhus (χ^2 = 6.667, p- value = 0.009

4. Discussion

In our study, sign and symptoms of scrub typhus are non-specific. Apart from high fever, the most common presenting symptom of our patients was headache followed by nausea vomiting and weakness (same observations were published in the paper by Zhang Z, et al.)[15]. Meningism was found in just one of the patients with headache. High fever, intense generalized headache, diffuse myalgia, rash, and an eschar at the site of the chigger bite are the most common symptoms of scrub typhus which are similar to the finding of this study[8], where patients' common presenting symptoms were fever (100%), followed by headache (54.13%), nausea/vomiting (23.78%). Lymphadenopathy was observed in 18.06% patients which is similar to study done by Bhinuti Saha et.al. [16]

In our study, majority of patients who had undergone screening test for scrub typhus had history of exposure to predisposing factors such as exposure to domestic animals (63.43%), being closest to forest or bushy area (57.70%), and history of rats infestations (44.49%), vegetation around houses (41.40%), and history of visit to forest (36.56%). Research studies[17] also reported that people working in the fields (i.e., farmers), residing in rural areas with their houses near the grasslands, living at the edge of village, sitting on grass for breaks, and having close contact with rats have higher risks for scrub typhus.

Out of 227 patients with, 13.65% of patients were seropositive for scrub typhus and 86.34% had negative results by IgM ELISA. This is consistent with the results of the other studies conducted in Nepal, in which the prevalence of scrub typhus was 13.3% and 69.4%, respectively, among clinically suspected patients.[18]

Regarding knowledge, only 29.07% of patients had heard the term scrub typhus. On item wise knowledge, out of those who heard the term scrub typhus, 52.9% knew scrub typhus as infectious disease, 59.09% knew about the mode of transmission through the bite of mite, and 16.66% knew that the scrub typhus spreads rapidly during the rainy season. Kim et al. also reported that 61.4% of patients in Korea heard the term scrub typhus, 44.4% of patients knew that scrub typhus is caused by small mite and 48.5% knew that it does not infect others.[19]

5. Conclusion:

Scrub typhus should be considered as a differential in any community acquired undifferentiated febrile illness regardless of the presence of an eschar, and needs empirical therapy along with testing for scrub typhus. When a patient presents with short term fever of about a week's duration scrub typhus should be considered as a possibility after malaria, dengue, chikungunya, typhoid, UTI, RTI, leptospirosis etc. The lack of knowledge is evident among patients. Moreover, emphasis should be given to raise general awareness among patients to decrease the prevalence/ incidence of scrub typhus in India. An early diagnosis and timely antibiotic therapy may prevent further complications.

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