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# Knowledge and Preventive Practices on Scrub Typhus among Caregivers Attending at Bharatpur Hospital, Chitwan, Nepal

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## ABSTRACT

### Background

Scrub typhus is a potentially fatal acute febrile illness can affect people of all ages and travellers across the globe who has visited regions of endemicity Assessing people's knowledge and preventive practices of scrub typhus helps to prevent infected mites-related diseases. This study aimed to find out the scrub typhus knowledge and preventive practices of the people attending a Bharatpur Hospital.

### Methods

A descriptive cross-sectional study was conducted at Bharatpur Hospital, Chitwan, from June 2024. Consecutive sampling technique was used among 406 the people who met the inclusion criteria. The data were analysed in SPSS version 20, using descriptive as well as inferential statistics

### Results

Among 406 participants, 53.0% and 54.4% participants had good level of knowledge and preventive practice, respectively. In the chi-square test applied to find the association between variables, participants' age group of $\leq$ 30 years ($P \leq 0.006$), service occupation ($P \leq 0.018$), bachelor and above education level ($P \leq 0.024$), and Brahmin/Chhetri ($P \leq 0.030$) were significantly associated with knowledge of Scrub Typhus.

### Conclusions

Overall, knowledge about scrub typhus and preventative practices were found to be good. Awareness programme on scrub typhus necessary to improve knowledge and practice among more than 30 years of age, agriculture worker and basic education and illiterate group

**Keywords:** scrub typhus; knowledge; outbreaks

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## INTRODUCTION

Scrub typhus is an acute febrile bacterial illness caused by Orientia tsutsugamushi and is transmitted to humans through the bite of infected chigger mites (Trombiculidae family).[1] It is considered a zoonotic disease and poses a significant public health concern, particularly in tropical and subtropical regions.[2] The disease presents with non-specific symptoms, including fever, headache, rash, eschar, and lymphadenopathy, making early diagnosis challenging.[3] If left untreated, scrub typhus can lead to severe complications such as multi-organ failure, acute respiratory distress syndrome (ARDS), and even death.[4]Globally, scrub typhus affects nearly one million people annually, with over one billion individuals at risk of infection.[5] The disease is endemic in the Asia-Pacific region, with high incidences reported in countries such as India, China, Thailand, and Nepal.[6] In Nepal, a nationwide outbreak was declared as cases were detected in 52 out of 75 districts, with a mortality rate of approximately 8%, particularly in Chitwan district.[7] The rise in cases highlights the urgent need for increased awareness, early diagnosis, and preventive measures to control the spread of the disease. Given the increasing burden of scrub typhus in Nepal, this study aims to assess the knowledge and preventive practices among people attending Bharatpur Hospital, Chitwan. Understanding public awareness and behavioral responses can help identify gaps in knowledge and promote targeted educational interventions to reduce the disease burden

## METHODS

A descriptive cross-sectional study was conducted from June to November 2024 to assess the knowledge and practices related to scrub typhus among individuals attending Bharatpur Hospital, Chitwan, Nepal. Ethical approval was obtained from the Institutional Review Committee of the same institute (Reference number: 080/81-013), and written informed consent was obtained before data collection. Participants who met the inclusion criteria were recruited using a consecutive sampling method. The sample size was calculated using Daniel's formula($n=z^2pq/e^2$). Considering a prevalence of study conducted by Sharma et al., showed the prevalence of knowledge on scrub typhus as 58.6%. Substituting the values $(1.96)^2\times0.58\times0.42/(0.05)^2=(1.96)^2\times0.58\times0.42/(0.05)^2$. Required sample size was determined was 374. To account for a 10% non-response rate (37 participants), the final sample size was adjusted to 411. However, after excluding incomplete responses, a total of 406 participants were included in the study. Data were collected using a semi-structured interview schedule that covered socio-demographic characteristics, scrub typhus-related variables, and preventive practices. Statistical analysis was performed using SPSS version 20, employing both descriptive and inferential statistical methods. A p-value of $<0.05$ was considered statistically significant.

## RESULTS

Among 406 participants, nearly half 161(39.7%) were below age group of 30 years, females were slightly more 222 (54.7%) than males. Two hundred eighteen (53.7%) participants belonged to Brahmin/Chhetri. All 134 (33.0%) participants were literate, among them more than half - 90 (22.0%) participants had taken higher secondary education only. Majority of the participants 121 (29.8%) were involved in agriculture. The information about scrub typhus was obtained from Mass Media by 174 (42.9%) participants (Table 1).

Table 2 illustrates the Knowledge Regarding Scrub Typhus (n=406). Almost all - 269 (66.3%) participants answered correctly that Scrub Typhus was caused by bite of infected chiggers. Regarding signs and symptoms, 319 (78.6%)) participants answered fever was the most common symptoms of scrub typhus. More than one third - 242 (59.6%) participants didn't know the fact that the Orientia Tsutsugamush transmitted the scrub typhus. Around 278 (68.5%) participants replied that Knowledge of Habitant of Scrub Typhus could be rainy session, rodents/soil and plants/vegetables. Regarding knowledge of prevention almost 349 (86.0%) participants knows the prevention of scrub typhus. Almost all 300 (73.9) participants knows the scrub typhus is treatable.

**Table 1. Socio-demographic variables of study participants (n=406**

| Variables | n(%) |
|---|---|
| **Age** | |
| ≤30 | 161 (39.7) |
| 31-40 | 104 (25.6) |
| ≥41 | 141 (34.7) |
| Mean age 36.71 ±12.73 years, Min(Max): 18(70) | |
| **Sex** | |
| Female | 222 (54.7) |
| Male | 184 (45.3) |
| **Ethnicity** | |
| Brahmin/Chhetri | 218 (53.7) |
| Janajati | 114 (28.1) |
| Dalit | 61 (15.0) |
| Muslim | 13 (3.2) |
| **Religion** | |
| Hindu | 283 (69.7) |
| Buddhist | 84 (20.7) |
| Muslim | 10 (2.5) |
| Christian | 29 (7.1) |
| **Educational status** | |
| Illiterate | 86 (21.2) |
| Literate | 134 (33.0) |
| Secondary | 72 (17.7) |
| Higher Secondary | 90 (22.2) |
| Graduate and above | 24 (5.9) |
| **Occupational status** | |
| Agriculture | 121 (29.8) |
| Business | 69 (17.0) |
| Student | 77 (19.0) |
| Service | 60 (14.8) |
| Household Work | 79 (19.5) |
| **Income per month** | |
| <20,000 | 157 (38.7) |
| 20,000-49,000 | 220 (54.2) |
| 50,000-1,00,000 | 29 (7.1) |
| **Source of information** | |
| Mass media | 174 (42.9) |
| Teacher/Health workers | 84 (22.6) |
| Neighbors | 125 (30.8) |
| Newspapers | 15 (3.7) |

**Table 4. Level of Knowledge on scrub typhus among respondents**

| Level of Knowledge | n(%) |
|---|---|
| Low Knowledge (≤19.42) | 191 (47.0) |
| High Knowledge(>19.42) | 215 (53.0) |

**Table 3 Preventive Practices Regarding Scrub Typhus**

| Preventive Practice | Yes n(%) | No n(%) |
|---|---|---|
| Clean house daily | 406 (100) | - |
| Clean/ change indoor garbage /Trash daily | 406 (100) | - |
| Clean bushes and vegetation around | 405 (99.8) | 1 (0.2) |
| Keep separate animal habitation | 337 (83.0) | 69 (17.0) |
| Use any insecticides on the soil to break up the cycle of transmission | 335 (82.5) | 71 (17.5) |
| Use boots and dress in full sleeves | 323 (79.6) | 83 (20.4) |
| Use repellent lotion to prevent chigger bites | 321 (79.1) | 85 (20.9) |
| Bathe/change clothes regularly | 394 (97.0) | 12 (3.0) |
| Seal the hole around the house | 373 (91.9) | 33 (8.1) |
| Store food items by covering it | 398 (98.0) | 8 (2.0) |

**Table 5 Level of Practice on scrub typhus among respondents**

| Level of practice | n(%) |
|---|---|
| Low practice (≤9.11) | 185 (45.6) |
| High practice (>9.11) | 221 (54.4) |

**Table 6 Association between level of knowledge with socio-demographic variables**

| Variables | level of knowledge | | P-value |
|---|---|---|---|
| | Low n(%) | High n(%) | |
| **Age (years)** | | | |
| ≤30 | 63 (39.1) | 98 (60.9) | |
| 31-40 | 47 (45.2) | 57 (54.8) | 0.006 |
| ≥41 | 81 (57.4) | 60 (42.6) | |
| **Occupation** | | | |
| Agriculture | 67 (55.4) | 54 (44.6) | |
| Business | 35 (50.7) | 34(49.3) | |
| Student | 30 (39.0) | 47 (61.0) | 0.018 |
| Service | 19 (31.7) | 41 (68.3) | |
| Household work | 40 (50.6) | 39 (49.4) | |
| **Education status** | | | |
| Illiterates | 48 (55.8) | 38 (44.2) | |
| Basic education | 64 (47.8) | 70 (52.2) | 0.024 |
| Secondary | 74 (45.7) | 88 (54.3) | |
| Bachelor and above | 5 (20.8) | 19 (79.2) | |
| **Ethnicity** | | | |
| Brahmin/Chhetri | 91(41.7) | 127 (58.3) | |
| Janajati | 65 (57.0) | 49 (43.0) | 0.03 |
| Dalit/Muslim | 35 (47.3) | 39 (52.7) | |

| Table 2. Knowledge regarding Scrub Typhus (n=406) | | | |
|---|---|---|---|
| **Variables** | **Yes n(%)** | **No n(%)** | **Don't Know n(%)** |
| **General** | | | |
| Scrub Typhus is caused by bite of infected chiggers | 269 (66.3) | 79 (19.5) | 58 (14.3) |
| Orientia Tsutsugamush transmitted to humans by chiggers | 109 (26.8) | 152 (37.4) | 145 (35.7) |
| Chiggers bite on harboring vegetation | 225 (55.4) | 80 (19.7) | 101 (24.9) |
| It outbreaks usually occur in rainy season. | 288 (70.9) | 54 (13.3) | 64 (15.8) |
| **Knowledge of signs and symptoms of Scrub Typhus** | | | |
| Fever is the most common symptoms | 319 (78.6) | 39 (9.6) | 48 (11.8) |
| Shortness of Breath | 260 (64.0) | 86 (21.2) | 60 (14.8) |
| Headache | 268 (66.0) | 65 (16.0) | 73 (18.0) |
| Muscle Pain | 243 (59.9) | 94 (23.2) | 69 (17.0) |
| Enlarged Lymph Nodes | 142 (35) | 177 (43.6) | 87 (21.4) |
| Abdominal pain | 208 (51.2) | 124 (30.5) | 74 (18.2) |
| Dark Scar | 218 (53.7) | 101 (24.9) | 87 (21.4) |
| **Knowledge of transmission of Scrub Typhus** | | | |
| Infected chigger or mite larva transmit Scrub Typhus | 299 (73.6) | 32 (7.9) | 75 (18.5) |
| All types of chigger transmit Scrub Typhus | 268 (66.0) | 35 (8.6) | 103 (25.4) |
| Orientia Tsutsugamush transmits Scrub Typhus | 227 (55.9) | 64 (15.8) | 115 (28.3) |
| Person to person contact transmits Scrub Typhus | 64 (15.8) | 100 (24.6) | 242 (59.6) |
| A blood transfusion can transmit Scrub Typhus | 52 (12.8) | 269 (66.3) | 85 (20.9) |
| **Knowledge of Habitant of Scrub Typhus** | | | |
| Rodent/soil | 277 (68.2) | 94 (23.2) | 35 (8.6) |
| Rainy season | 277 (68.2) | 94 (23.2) | 35 (8.6) |
| Garbage/Trash | 278 (68.5) | 44 (10.8) | 84 (20.7) |
| Plants/Vegetation | 267 (65.8) | 52 (12.8) | 87 (21.4) |
| **Knowledge on prevention** | | | |
| Scrub Typhus can be prevented | 349 (86.0) | 8 (2.0) | 49 (12.1) |
| Minimize exposure to bushes and vegetation can reduce mite bite | 317 (78.1) | 41 (10.1) | 48 (11.8) |
| Insecticides on the soil to break up the cycle of transmission | 228 (56.2) | 89 (21.9) | 89 (21.9) |
| Repellants prevent bite of mite larva | 249 (61.3) | 69 (17.0) | 88 (21.7) |
| Cutting down bushes and vegetation can reduce larvae of mite | 314 (77.3) | 39 (9.6) | 53 (13.1) |
| Wearing full-sleeve clothes and boots can prevent mite bite | 330 (81.3) | 28 (6.9) | 48 (11.8) |
| **Knowledge on Treatment** | | | |
| Scrub Typhus is treatable | 300 (73.9) | 45 (11.1) | 61 (15.0) |
| Scrub Typhus can be managed at home | 224 (55.2) | 102 (25.1) | 80(19.7) |
| Vaccine can prevent Scrub Typhus | 160 (39.4) | 158 (38.9) | 88 (21.7) |

Table 3 illustrates Out of 406, almost all the participants 405 (99.8%) were good Preventive Practices Regarding Scrub Typhus.

Out of 406, Majority of participants 215 (53.0%) had good level of knowledge on scrub typhus. Based on mean score (19.42±3.767), min.6 max 26 score (Table 4).

Out of 406, Most of 221(54.4%) of Participants had good level of preventive practice of scrub typhus. Mean 9.11(1.25), minimum 5 and maximum 10 score (Table5). Following table reveals the association between level of knowledge on Scrub typhus and socio-demographic variables shows that significantly associated with the age group <30 were more likely to have knowledge of scrub typhus as compare to 30 -41 years ($P \leq 0.006$). Likewise in occupation, service demonstrated a significantly higher level of knowledge about, as compared to those who had engaged in agriculture (P

≤ 0.018). There was significantly higher knowledge of scrub typhus among Brahmin/Chhetri ethnicity (P≤0.030). Similarly, the respondents who had Bachelor and above education had significantly more knowledge as compared to those who had basic education and illiterate education(P≤ 0.024) (Table 6).

## DISCUSSION

This study included a total of 406 participants, of whom nearly half (39.7%, n=161) were below the age of 30 years. The gender distribution showed a slight predominance of females (54.7%, n=222) compared to males. In terms of ethnicity, the majority of participants (53.7%, n=218) belonged to the Brahmin/Chhetri community. Regarding educational background, 33.0% (n=134) of the participants were literate, with more than half of them (22.0%, n=90) attaining higher secondary education. This indicates a moderate level of formal education within the study population. The occupational distribution revealed that the largest proportion of participants (29.8%, n=121) were engaged in agriculture, highlighting their potential occupational exposure to vector-borne diseases such as scrub typhus. This aligns with previous research indicating that individuals involved in agriculture and outdoor activities are at higher risk of contracting scrub typhus due to their increased exposure to chigger-infested areas.[13]

Mass media played a crucial role in disseminating information about scrub typhus, with 42.9% (n=174) of participants reporting it as their primary source of knowledge. This finding underscores the significance of electronic and print media in public health awareness campaigns, consistent with earlier studies that have emphasized the role of media in improving disease awareness and preventive behaviour.[14]

The study assessed participants' knowledge about scrub typhus, including its causes, symptoms, transmission, and prevention. A significant proportion (66.3%, n=269) correctly identified that scrub typhus is caused by the bite of infected chiggers. Regarding symptoms, 78.6% (n=319) of participants recognized fever as the most common clinical manifestation of scrub typhus. However, knowledge about the causative agent, Orientia tsutsugamushi, was relatively low, with 59.6% (n=242) of participants unaware of this fact. Similar findings were reported in studies conducted in endemic regions, where gaps in knowledge about the specific pathogen were observed despite awareness of clinical symptoms.[15,16]

Participants' understanding of the habitat of scrub typhus was also evaluated. About 68.5% (n=278) identified common habitats of the disease as the rainy season, rodents, soil, plants, and vegetables. This indicates that a significant portion of the population is aware of potential environmental risk factors associated with scrub typhus transmission, which is consistent with epidemiological studies highlighting these as key determinants in the spread of the disease.[17]

Regarding preventive measures, a large majority (86.0%, n=349) of participants reported awareness of how to prevent scrub typhus. Additionally, 73.9% (n=300) knew that scrub typhus is a treatable disease. These findings suggest a relatively high level of knowledge about disease management, which is essential for early intervention and reducing morbidity.

The study revealed that 53.0% of participants had a high level of knowledge about scrub typhus. This finding is consistent with a study conducted at Chitwan Medical College, Nepal, which reported that 58.6% of respondents had a high level of knowledge about the disease.6 However, these results contrast with a pilot study conducted in Thailand, where 96.3% of participants demonstrated low knowledge levels regarding scrub typhus.[18] This discrepancy highlights the need for targeted awareness programs in different geographical regions to address gaps in public knowledge.

In addition to assessing knowledge, the study also evaluated participants' preventive practices against scrub typhus. The results showed that 54.4% of participants engaged in high levels of preventive behavior. These preventive measures may include using protective clothing, applying insect repellents, avoiding known habitats of chiggers, and maintaining good hygiene practices. The study's findings on

preventive practices align with research conducted in Niigata Prefecture, Japan, where 75% of respondents reported adopting preventive measures against scrub typhus.[19,20] This suggests that awareness and education can positively influence public health behaviors, leading to better disease prevention. These findings highlight the importance of continued health education campaigns, particularly in endemic areas, to enhance public knowledge and promote effective preventive strategies against scrub typhus.

## CONCLUSIONS

The study highlights a moderate level of knowledge and preventive practices regarding scrub typhus among the participants attending Bharatpur Hospital, Chitwan. While more than half of the respondents had a high level of knowledge, there were still significant gaps in understanding the causative agent and transmission of the disease. The study underscores the importance of mass media as a crucial source of health information and the need for targeted public health interventions to improve awareness and preventive practices. Further educational campaigns and community outreach programs can help enhance public knowledge and reduce the burden of scrub typhus in endemic areas

### Limitations

This study has some limitations. Descriptive cross-sectional research study was carried out in a single setting which does not determine the causal relationship between the variables. Consecutive sampling technique was used to select the sample. The timing of snapshot is not guaranteed to be representative. In addition, Researcher did not observe actual practices as data was collected through self-reported preventive practice of scrub typhus.

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**Conflict of interest:** None

## REFERENCES

1. Nepal TN, Drukpa S. Scrub Typhus in a febrile patient and challenges faced in a diagnosis-constrained health centre. Journal of SAGE Open Case Reports.2023;11;1-4 .[DOI]
2. World Health Organigation. Scrub Typhus, 2024(cited 3May 2024). [Link]
3. Dhimal M,Dumre SP, Sharma GN, Khanal P,Ranabhat K, Shah PS. An outbreak investigation of scrub typhus in Chitwan Nepal. Journal onBMC Infectious Diseases; 21, 193 (2021). [Link]
4. Tasak, N., Apidechkul, T., Law, A.C.K. *et al.* Prevalence of and factors associated with scrub typhus exposure among the hill tribe population living in high incidence areas in Thailand: a cross-sectional study. *BMC Public Health* 23, 2394 (2023). [DOI]
5. Acharya K P, Adhikari N, Tariq M, A serious Public Health Issue in Nepal, Journal on Clinical Epidemiolody and Global Health:8(3) 2020, 815-817. [Link]
6. Lamichhane P, Pokhrel K, Alghalyini B, Khanal K, Bhattarai M, Yadav A. Epidemiology, clinical characteristics, diagnosis, and complications of scrub typhus infection in Nepal. Journal on National Library of Medicine: 2023 Sep 5;85(10):5022-5030. [PubMed]
7. World Health Organization, Scrub Typhus, 2024 (cited 6 May 2024). [Link]
8. DoHS, Annual Report 2078/79 (2021/22). [Link]
9. Jain H K, Das A, Dixit S, Kaur H, Pati S, Rangit M, Dutta A. Development and implementation of a strategy for early diagnosis and management of scrub typhus: an emerging public health. [Link]

10. Karki KB, Acharya BP, Dhimal M, Aryal KK, Sharma GN, Khanal P, Ranabhat K, Dumre SP, Jha AK. Descriptive Epidemiology of Scrub Typhus in Nepal, Kathmandu, Nepal, 2017. Nepal Health Research Council (NHRC). [Link]
11. Narita T, Abeywickrama H M, Sato M O, Watanabe K, Arai R, Tamura T et.al . Knowledge, Practice and Practices Regarding Scrub Typhus Among an at risk population living in Niigate Prefecturer, Japan. Journal on PLOS ONE June 30, 2022. [DOI]
12. Sharma K, Neupane M S, Poudyl S, Subba H K. Prevalence and knowledge of Scrub Typhus in patients with acute febrile illness in Teaching Hospital, Chitwan, International Journal of Medical Science and Public Health;8(11) 2019. [Link]
13. Xu G, Walker DH, Jupiter D, Melby PC, Arcari CM. A review of the global epidemiology of scrub typhus. PLoS Negl Trop Dis. 2017;11(11):e0006062. [Google Scholar]
14. Taylor AJ, Paris DH, Newton PN. A systematic review of mortality from untreated scrub typhus. PLoS Negl Trop Dis. 2015;9(8):e0003971. [DOI]
15. Karki KB, Acharya BP, Aryal KK, Bista B, Dhimal M. Epidemiology of scrub typhus in Nepal. J Nepal Health Res Counc. 2020;18(2):151-159. [Link]
16. Richards AL, Jiang J, Day NPJ. The worldwide impact of scrub typhus. Microbiol Spectr. 2019;7(2):10.1128. [Link]
17. Pokhrel A, Rayamajhee B, Khadka S, Thapa S, Kapali S, Pun SB, Banjara MR, Joshi P, Lekhak B, Rijal KR. Seroprevalence and clinical features of scrub typhus among febrile patients attending a referral hospital in Kathmandu, Nepal. Tropical medicine and infectious disease. 2021 May 13;6(2):78.[DOI]
18. Sharma K, Neupane MS, Poudyal S, Subba HK. Prevalence and knowledge of scrub typhus in patients with acute febrile illness in teaching hospital, Chitwan, Nepal. Int J Med Sci Public Health. 2019;8(11):897-901.[Link]
19. Blacksell SD, Tanganuchitcharnchai A, Nawtaisong P, Kantipong P, Laongnualpanich A, Day NP, Paris DH. Diagnostic accuracy of the InBios scrub typhus detect enzyme-linked immunoassay for the detection of IgM antibodies in northern Thailand. Clinical and Vaccine Immunology. 2016 Feb;23(2):148-54. [DOI]
20. Furuya Y, Katayama T, Hara M, Yoshida Y, Imai M, Hagiwara T. Occurrence of scrub typhus (Tsutsugamushi) in Kanagawa Prefecture and types of Orientia tsutsugamushi involved. [Link]

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