Nepal Journal of Epidemiology

eISSN 2091-0800

Editorial *Open Access*

Scrub Typhus in Nepal

Niranjan Nayak[1]

Correspondence: Dr. Niranjan Nayak, Professor, Department of Microbiology, Manipal College of Medical Sciences, Pokhara , Nepal.
Email: niruni2000@yahoo.com

Received 5 June 2016/**Revised** 20 June 2016/**Accepted** 20 June 2016

Citation: Nayak N. Scrub Typhus in Nepal. Nepal J Epidemiol. 2016;6(2); 563-564.

Scrub typhus is a rickettsial disease, reported from many Asian countries including Nepal [1]. It is a zoonotic disease transmitted by the blood sucking larva (chigger) of the arthropod, mite. The causative agent of this disease, that is transmitted through the bite of the chigger is *Orientia tsutsugamushi*, an obligate intracellular organism. Though there are recent reports of this infection, not infrequently, encountered in many parts of Asia [2], the index of suspicion, in clinical settings, is still low. This is because the typical rash and eschar may not be always evident, and fever, on several occasions, may go unnoticed [3], leading to an error in diagnosis. Moreover, the clinical features such as fever, headache, myalgia, dry cough etc. can be quite non-specific especially in endemic areas.

Scrub typhus is otherwise known as chigger borne typhus, because man gets the infection by the bite of an infected chigger [4]. Chigger is the only form in the life cycle of the mite that bites the warm blooded animals for its blood meal, whereas the other life forms i.e. nymph and adults live on soil and plants. The chiggers after getting infected exhibit high degree of potential for the transmission of *Orientia tsutsugamushi*. This happens because of the transfer of the causative agent, *O tsutsugamushi* in-between different stages of the vector (transstadial transmission) as well as transmission of the agent from adult to the offspring (transovarial transmission). In this way, the vector is able to maintain the infectivity for a prolonged time period. Therefore, it is now believed that mites, apart from being vectors may behave as reservoirs as much as the rodents do [5].

Scrub typhus is an occupational disease commonly found in particular geographical locations conducive to the survival and multiplication of the mite population as well as the reservoir hosts. These areas, rich in scrub jungles, provide the perfect ecological niche for the existence of the essential “zoonotic tetrad’ (chiggers, rodents,scrub forest and mites) which helps sustaining a sylvatic cycle among the chiggers and rodents . Man trespassing these so called “mite islands”, for collection of woods, is bitten by the chiggers.

Though scrub typhus is generally a rural disease, outbreaks in urban localities is not uncommon. If factors are permissive for the establishment of a temporary, "mite island," an epidemic or sporadic outbreak could conceivably occur. These "islands" may be artificially created by patching grassland that could congregate the mites. Colonies of mites might flourish if the soil is damp, and rodent population is bound to change its habitat from bur wholes to open areas (temporary mite islands), especially after natural calamities like earthquake.

Recent reports of scrub typhus from various parts of Nepal might be a true reflection of the above ecological niche and epidemiologic behavior of the vector due to the altered environmental factors that could have occurred after the recent earthquake and could have triggered such outbreaks as a result of intimate contact between human beings and rats that might have come out of their usual underground habitat after the

collapse of many houses. Over and above, natural disaster like earthquake would compel human beings to alter their living conditions. Overcrowding and unsanitary conditions could augment the linkage between vector, pathogen and man. Human migration could further compound on the situation by providing the possibility of close proximity between human dwelling and the breeding sites of the vectors and reservoirs.

Thus the afore-mentioned reports on scrub typhus in the form of a post earthquake event, is not unusual. From the epidemiologist's viewpoint, each communicable disease has to have certain characteristics that will help assessing its potential risk following a natural disaster. In order to prevent or restrict the spread of the re-emerging disease like scrub typhus, one has to critically analyze whether or not a there existed a seasonal pattern of the disease in that particular area and if, occurrence of the present episode was in excess of those recorded in the seasonal outbreaks. In the event of any triggering factors prevailing in the disaster affected area, those could be identified and necessary steps could be undertaken so that factors contributing to survival of the vectors, increasing dispersal of the vectors, and congregation of vectors or reservoirs in close proximity to humans could be eliminated. The first and foremost measure could be formulating the disease distribution maps and to locate disease affected area in relation to the disaster area, where drastically cutting the grass and packing the soil might limit the population densities of the mites. Application of chlorinated hydrocarbons to the grounds and vegetations in the vicinity of disaster camps and other populated areas can help in reducing the mite density.

Reportedly, many cases of fever of unknown origin (FUO) often remain poorly differentiated due to inadequate laboratory facilities in Nepal, although, fever remains one of the commonest reasons for seeking medical advice [1].Since the burden of other infections such as enteric fever seemed to be substantial, the clinical suspicion of scrub typhus in the differential diagnosis of "fever of unknown origin" is likely to be undermined, even though parts of Nepal, appeared to be suitable hubs for scrub typhus [6].

Unfortunately, it is not feasible to prepare an effective vaccine against scrub typhus, because of the extreme antigenic variation seen amongst the strains of *O tsutsugamushi*. Immunity acquired naturally against one antigenic type may not be protective against another type which might be currently circulating in the locality. This complexity continues and the problem of making an effective vaccine against this disease still persists.

Conflict of interest:

The author declares that he has no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding:

The author received no financial support for the research, authorship, and/or publication of this article.

Author's affiliation:

[1] Professor, Department of Microbiology, Manipal College of Medical Sciences, Pokhara , Nepal.

References:

1. Murdoch DR, Woods CW, Zimmerman MD, Dull PM, Belbase RH, Keenan AJ et al. The etiology of febrile illness in adults presenting to Patan Hospital in Kathmandu Nepal. Am J Trop Med Hyg. 2004;70:670-75. PMid:15211012

2. Basnayat B, Belbase RH, Zimmerman MD, Woods CW, Reller LB, Murdoch DR. Clinical features of scrub typhus. Clinical Infectious Dis. 2006;42:1505. http://dx.doi.org/10.1086/503680
PMid:16619174

3. Thompson CN, Blacksell SD, Paris DH, Arjyal A, Karkey A, Dongol S er al. Undifferentiated febrile illness in Kathmandu Nepal. Am J Trop Med Hyg. 2015;92:875-878. http://dx.doi.org/10.4269/ajtmh.14-0709
PMid:25667056 PMCid:PMC4385789

4. Lerdthusner K, Khuntirat B, Leepitakrat W et al. Scrub typhus:vector competence of Leptotrombidium chiangraiensis chiggers and transmission efficacy and isolation of Orientia tsutsugamushi. An N Y Acad Sci. 2003;990:25-35.
http://dx.doi.org/10.1111/j.1749-6632.2003.tb07333.x

5. Walker JS, Chan CT, Manikumaran C et al. Attempts to infect and demonstratetransovarial transmission of R tsutsugamushi in three species of Leptotrombidium mites. Ann N Y Acad Sci. 1975;266:80-90. http://dx.doi.org/10.1111/j.1749-6632.1975.tb35090.x
PMid:829478

6. Brown GW,Shirai A,Gan E,Bernthal P. Antibodies to typhus in Eastern Nepal. Trans Roy Soc Trop Med Hyg 1981;75:586-587.
http://dx.doi.org/10.1016/0035-9203(81)90210-8