

Potential Threat of Rabies Virus from Bat Bite in Nepal

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Rabies is a zoonotic viral disease caused by rabies virus, of the genus *Lyssavirus*, family *Rhabdoviridae* [1]. It is one of neglected zoonotic diseases and remains a major public health concern globally. The disease is highly risk in developing countries like Nepal [2-4]. It is an endemic and priority zoonotic disease in Nepal. Rabies is transmitted by bite of infected dogs, cats, monkeys, wild animals (mongoose, wolf, fox, raccoon, jackal and bat) to human population [5,6].

It occurs in two epidemiological cycles: the urban cycle involves domesticated dogs, and the sylvatic cycle involves wild animals [7]. The urban cycle is maintained by the street and community dogs and is the main source of human rabies. The dog population in Kathmandu valley was around 22,300 in 2012 [8]. In countries where dogs are the primary source of infection to humans, vaccination of dogs can help reduce or eliminate the human rabies burden. Vaccines help to establish pre-exposure immunity and to protect individual animals from contracting rabies, hereby preventing further spread to humans or other domestic animals [9].

The first human fatality case due to vampire bat attack was reported from the time of the Spanish colonization of the Americas during the sixteenth century [10]. The previous studies revealed that no human rabies cases transmitted due to bats were documented in Nepal till date [11]. However, a research study showed that endemic colonies of giant fruit bats (*Pteropus giganteus*) known to reservoirs for multiple zoonotic viruses in Kathmandu Valley [12].

Although human cases in developing countries have been mostly associated with dog bites, bat species may also be infected by rabies virus (RABV) [13-14]. Deforestation has drastically reduced the number of natural prey for bats. The migration pattern of bats from rural to urban areas for food supply may also increase potential contact with domestic and wild animal populations and human beings [15]. In some European countries, Cats have been considered a high-risk species for rabies transmission to humans due to predatory behavior of flying birds including bats which may connect rabies from the sylvatic-aerial cycle to urban settings. Such scenarios may appear in major urban areas of Nepal [16].

Rabies is a 100% vaccine preventable disease. Successful elimination of human rabies requires a multisectoral collaborative approach. Prevention of animal rabies, better public awareness and improved access to cost-effective and high-quality human rabies vaccines are essential for the elimination of human rabies [17,18]. However, Nepal has been facing a number of barriers-technical, intersectoral, organizational and financial. In addition, there has been poor implementation sylvatic rabies surveillance, dog rabies control campaigns and dog population control programmes [17,18].

Government of Nepal should take quick and urgent action to prevent the zoonotic rabies virus disease by formulating rabies elimination strategies such as [6]; developing the protocol for identification, characterization of rabies virus at regional, national and international level laboratory, identification and control the source of entry virus, enhancement of laboratory-based surveillance in domestic and wild animals, increased rate of vaccination in animals against rabies, restriction of animal movement, coordination of a multi-agency response [19], provision for public/ professional outreach and education guidelines in addition to implementing the strong strategy plan to further reduce of zoonotic rabies outbreak in future. Globally, one of successful model like One health approach or Ecohealth approach or One Science should be engaged to prevent zoonotic disease by government of Nepal to avoid panic outbreak in future of particular zoonotic rabies virus.

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