



Letter to the Editor

The possible threat of zoonotic diseases from stray dogs in Nepal

Dear Editor,

The stray dog population is a significant problem in major cities in Nepal [1]. For instance, Kathmandu, the capital city of Nepal, has approximately 20,000 stray dogs, while other major cities such as Pokhara, Lalitpur, and Biratnagar also have large numbers of such stray dogs, ranging from 2000 to 20,000 [2]. However, the true population could be higher than reported as the comprehensive demographics of stray dogs are lacking in Nepal.

The available body of evidences have reported that stray dogs in Nepal harbor zoonotic pathogens such as *Toxocara canis*, *Taenia spp.*, *Dirofilaria immitis*, *Babesia spp.*, *Ehrlichia canis*, *Anaplasma spp.*, *Leishmania donovani* and *rabies virus* and are supposed to be the major reservoirs of several other zoonotic pathogens, which is attributed to immunosuppression from malnutrition and from a lack of healthcare services such as routine immunization, deworming, and treatment against external and internal parasites [3]. Furthermore, the presence of zoonoses in stray dogs is aided by the presence of climate ranges ranging from tropical in the South to temperate in the North, where major cities are located, which is conducive to the presence of vectors such as flies and ticks harboring zoonotic pathogens, as suggested by Díaz-Regañón and colleagues [4]. This presence of zoonotic diseases in the free-roaming stray dog population points towards a high threat of zoonotic diseases to humans from stray dogs, as these stray dogs are in close contact with humans in Nepal. Furthermore, humans may acquire zoonotic pathogens through contaminated food, water, and the environment, as open-defecating, free-ranging dogs are common in Nepal.

The number of stray dogs has been continuously growing in major cities in Nepal due to the high reproduction rate of dogs associated with the surplus food available in municipal waste owing to a lack of proper disposal of household waste materials, which acts as the source of food for stray dogs, which further has led to more interactions amongst stray dogs, domestic dogs, and humans. Moreover, humans are attracted to the pups, even if they are stray ones. All these factors will lead to frequent encounters between humans and dogs, thereby increasing the transmission of diseases harbored by stray dogs.

The diseases, including zoonotic ones, harbored by stray dogs are not only a national issue but also of international concern, as stray dogs from Nepal are exported to Western countries such as Canada and the USA by animal pet lovers and their organizations, such as Temple Dog Rescue, for adoption. It is quite possible that zoonotic diseases carried by these exported stray dogs will spread to the importing countries as a result of this animal export. Even if the dogs are tested for symptoms before export, the disease may go unnoticed if it is during its incubation period and may transmit diseases, including disease pathogens in dogs that have already been eradicated in Europe and America. However, research data are lacking to assert this assumption, but the transmission of zoonotic pathogens to other countries as a result of animal export and then

to humans is a distinct possibility.

Therefore, in-depth, comprehensive molecular and epidemiological surveillance should be conducted to understand the epidemiology and transmission dynamics of zoonotic diseases between stray dogs and humans in Nepal. The presence of zoonotic diseases in stray dogs harbingers the threat of zoonoses to humans due to the close stray dog-human interface in Nepal. However, the real scenario of the transmission of zoonoses between stray dogs and humans is still unknown due to the absence of research on this aspect. Nonetheless, the situation and burden of zoonoses in stray dogs in Nepal should be assessed and appropriate control programs should be implemented to prevent the transmission of these zoonoses to humans.

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Contributors

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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