



## Commentary

**Rabies in Pakistan: A never ending challenge**

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*Dear editor,*

A lethal neurological condition called rabies may result in paralysis or the usual, furious form of the disease [1]. Dog, skunk, raccoon, and bat bites are typical carriers of the illness. It is essential to have laboratory testing to validate an antemortem rabies diagnosis [2]. Preclinical anterior horn cell dysfunction is seen days before brain symptoms manifest in individuals with severe rabies, and the virus is active in the CNS for a significant period of time before aberrant brain MRI findings. We are beginning to comprehend the catastrophic effects of the virus and how it modifies patient behavior [1]. Fever, malaise, and photophobia are symptoms of the illness as it develops to paralysis, coma, and death. Rabies has no effective cure, and those who survive it are uncommon [2]. On the other hand, preventative rabies treatments work wonders after known exposures.

One of the most disregarded chronic endemic illnesses and avoidable infectious disorders in the Indo-Pak subcontinent is rabies. Since dogs are the most frequent source of transmission, it is still a serious issue in many developing nations [3]. Over 55,000 people are killed by rabies annually, according to the World Health Organization, with over 31,000 of those deaths occurring in Asia alone, mostly in children [4]. To minimize the prevalence of dog bites or rabies in substantial manners, the country critically needs to apply the following actions: a consistent and improved supply of rabies prophylactic measures, canine vaccination, enforced accountable animal ownerships, executing a systematic One Health strategy, and diagnostic labs equipped with the latest management [5]. A multi-disciplinary strategy should be employed by the government and health regulating bodies to reduce the prevalence of rabies in Pakistan. Significant public and healthcare worker education on appropriate and urgent PET, particularly the use of cost-effective cell culture intradermal regimens, is required instantly. An independent agency is needed to monitor vaccine quality, and strategies are needed to conserve the cold chain. Purified equine rabies immunoglobulin (ERIG) should be generated locally to meet national needs. Furthermore, effective dog control tactics should be enforced to decrease the rabies reservoir [6].

Health regulatory organizations should develop effective control plans for treating rabies patients, which will enable physicians in properly diagnosing rabies patients. Vaccination shortage must be handled environmentally, and areas with a higher occurrence of illness

must be well-stocked with vaccine supplies. The government must design a proper strategy, with the assistance of international organizations such as WHO, to work on strategies that are strong and substantial enough to reduce the onset of Rabies in the middle of COVID-19 [7]. The poor sanitation level of most of the towns in Pakistan is the primary cause of the intense and distinct endemics of the region. Lack of awareness, vaccine hesitancy, and knowledge gap similarly exacerbate the prognosis [8]. Rabies is caused by the virus from the genus *Lyssavirus* from the family of *Rhabdoviridae* [9]. A study conducted by Srinivasan et al. (2005) in four case studies of an organ transplant in the host infected by rabies in donor found that all four recipients died within fifty days after the transplant [9]. Hence, rabies can transmit to the host by the donors during the transplant procedure [9]. A cross-sectional study by Zarif et al. (2017) indicates that much poorer Pakistani sells their organs for money, which has led to illegal organ transplant [10]. Although illegal organ donation is curbed by 'Transplantation of Human Organs and Tissues Bill 2007', due to lack of literacy and illegal transplants centers the practice remains intact through backdoor middlemen [11]. Hence, there is a lack of research on the percentage of the rabies-infected population involved in organ donation in Pakistan [11].

To date, there is the unavailability of any research on the bijective link between SARS-CoV-2 and the rabies virus itself. However, an interesting study by Kurup et al. (2020) found a vaccine induced with SARS-CoV-2 spike S1 protein in rabies virus-based vector (RABV) to provide safe, effective, and efficient prevention against the SARS-Cov-2 virus [3]. Furthermore, it also produces a neutralizing antibody at much higher levels by using either activated or inactivated RABV-based vaccines [12].

In 2015, three global organizations; including the World Health Organization (WHO), the World Organisation for Animal Health (OIE), and the Food and Agricultural Organization of United Nations (FAO), collaborated under 'One Health' initiative to eradicate canine rabies transmission to human by 2030 [13]. In this effort, the collaboration of these three global organizations created the 'Global Framework for the Elimination of Dog-Mediated Human Rabies' that focuses on rabies elimination by adopting sociocultural, technical, organizational, political and resources (STOP-R) framework [13]. The strategy to implement this goal revolves around increasing awareness about preventable rabies infection, strengthening the human and animal surveillance system,

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encouraging regional and national collaboration, emphasizing regional governmental involvement, and sponsoring the policies and practices to implement the elimination strategy [13].

Eliminating dog-mediated rabies through highly attenuated 3rd generation SPBN GASGAS vaccines of the dogs is the foremost strategy to deal with rabies-related viruses and death, but this remains the most undermined method [14]. Pakistan is facing an acute shortage of 800,000 doses of the rabies vaccines and rabies immunoglobulin, especially at the rural town levels, which results in deaths in children [6]. Consequently [15], Pakistan is expected to run a drive to eliminate 25,000 stray dogs by the cruel methods of either poisoning or shooting them in the head [16]. The cruelty of the elimination process of stray dogs remains highly debatable. As the lack of a proper and documented surveillance system in Pakistan results in the death of children every year due to dog-bites causing rabies, especially in rural areas of Sindh, which was evident during the flood season in Sindh [17]. In 2016 alone, the National Health Management Information System (NHMIS) in Pakistan reported over 97,000 cases of dog bites, with three cities accounting for 84.2% of the total reported cases: Karachi (59.7%), Peshawar (13.1%), and Hyderabad (11.4%) [18]. Hence, a timely intervention may save lives caused by rabies due to dog bites.

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No conflict of interest.

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