

## **Re-emerging zoonotic disease Leptospirosis in Tanzania amid the ongoing COVID-19 pandemic: needs attention**

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Dear Editor,

Although leptospirosis outbreak is rare, it is not unexpected in the United Republic of Tanzania (URT). Recently, the URT reported 20 leptospirosis cases including three deaths as on August 8, 2022 [1]. 15 out of the 20 cases were laboratory-confirmed, and the majority of the cases were 18–77 years old men. As many were reportedly agriculturally active farmers, occupational exposure seems to be the source of infection. Although new or missed cases are being investigated and identified, no new cases have been reported for more than a month since July 15, 2022. The Ministry of Health (MoH) of the URT notified WHO about the reported leptospirosis cases. Attributed to climate and environmental conditions, leptospirosis is turning as a worldwide public health threat. Human subjects negative for Influenza, Chikungunya, Ebola virus disease, Marburg virus disease, West Nile virus, Crimean-Congo haemorrhagic fever, yellow fever, and Rift Valley fever, subsequently tested leptospirosis positive exhibiting symptoms of bleeding from nose, headache, fever and general body-ache. Its incubation period is usually 7–10 days. Leptospirosis occurs in two phases: the first phase manifested with fever, chills, muscle aches, headache, vomiting and/or diarrhoea after which the patient may recover for a short while but develops illness again, and the more severe second phase wherein the person may develop meningitis, kidney failure or liver failure [2]. Humans are infected mainly through contact with urine or other non-salivary body fluids of the infected domesticated pets and animals like dogs, pigs, cattle, rodents, horses, racoons, and wild animals, or contact with the contaminated water, soil or food of the infected animal. *Leptospira* enters the human body through the mucous membranes of the mouth, nose and eyes or through skin cuts or abrasions [3]. Leptospirosis outbreak is associated with floodwater, animal or sewage contaminated water, changes in animal reservoir density, or following a natural disaster. More severe outcome may depend on the prevailing epidemiological conditions, host susceptibility and the pathogen virulence [4]. Instances of human-to-human transmission are rare.

Caused by the *Leptospira*, Leptospirosis affects both humans and animals [3]. The organism is long, thin, motile spirochete that spreads through the urine of infected animal host. It could survive well in freshwater and warm wet soil. With nearly 300 known pathogenic serovars, it is antigenically complex [2]. The clinical symptoms of leptospirosis in humans include high

fever, headache, muscle aches, chills, vomiting, abdominal pain, jaundice, and diarrhoea [2]. It presents acute febrile illness, and the symptoms may confuse with influenza and dengue fever. Hemorrhagic complications that may lead a greater fatality rate are also common. Most leptospirosis symptoms are also similar to COVID-19, so confusing amid the ongoing COVID-19 pandemic to certain extent. As the etiological symptoms are similar to few other infectious diseases, it is very essential to correctly diagnose and treat a patient in early stages and prevent severe illness. Else, it may lead to renal and cardiac failure, and pulmonary haemorrhages. Nearly 10% of the patients develop severe disease manifestations. The case fatality rate (CFR) lies between 5 and 15% from among the severe clinical illness cases. Some infected persons may remain asymptomatic, who without proper and timely treatment may develop kidney damage, liver failure, meningitis, respiratory distress, and even death. Even in face of the current critical leptospirosis situation in the URT, the WHO has not yet recommended trade or travel restrictions to there.

This disease is common particularly in the temperate or tropical regions. People engaged in farming, mining, sewerage, veterinary and animal caretaking are at greater risk. Leptospirosis infection cases are increasing these days among urban children. For reduced severity, suspected patient could contact healthcare providers. Antibiotics like penicillin or doxycycline can treat leptospirosis at early stage [2], which may be administered intravenous in persons with severe symptoms. For protection, protective footwear and clothing is highly recommended when exposed to animal urine contaminated water or soil, or risking contact with potentially infected animals.

Despite its increasing number of cases globally, leptospirosis is a typically under-diagnosed and underreported neglected disease [5]. Globally, nearly 500,000 persons are estimated to be annually infected with leptospirosis [6]. It is one of the top ten infectious global hazards, and after dengue and influenza it is the third infectious hazard in the US [7]. All healthcare workers in the affected areas should be trained on the disease, its clinical presentations, infection prevention and control, and the local epidemiological factors. They may also be apprised of the use of appropriate medical care including personal protective gears particularly in the affected locality. Healthcare workers could be informed about suitable and effective treatments for the disease. A detailed national health response plan with enhanced leptospirosis surveillance in relation to the human and animal health needs to be developed. Additionally, samples from humans, animals and water sources may be collected on a regular

basis for laboratory testings. Disinfection of the suspected or contaminated areas wherever feasible may be undertaken. Although the exact source of leptospirosis outbreak remains unclear, however it is likely linked to farming activities [3].

Leptospirosis was reported previously in the URT in 2014. Record of its occurrence in other regions is lacking owing to limited surveillance capacity. The global leptospirosis outbreaks and the epidemiological features have been thoroughly reviewed [8]. There have been 318 reported leptospirosis outbreaks during the period 1970–2012 with an annual average of 7 outbreaks. Most of these were identified in the tropical and subtropical ecological regions particularly 55% in the Latin America, 36% in the Caribbean region, 13% in Southern Asia, and 11% in North America. The average outbreak size was 253 cases in the tropical and subtropical regions and overall 82 cases. The identified common risk factors include 25% attributed to outdoor activities, 23% to exposure to floodwaters, and 22% to exposure to recreational water. The overall case fatality reportedly was 5%. However, the data on the diagnosis and epidemiology is limited. Surveillance including active case search should be reinforced in all affected areas and contiguous population. In case the number in various areas increases vis-a-vis other ongoing health threats like COVID-19, the capacity to respond simultaneously might be overwhelming [3]. The risk of the spread of the disease both at regional and global levels is considered low as per the initial data of the WHO. Elevated research and surveillance to understand the infection source, the route of transmission and infection of human host is highly recommended. Mortality rate increases in more than 60-year old patients. A patient experiences a cytokine storm characterised by high levels of IL-6, IL-10 and TNF- $\alpha$  in case of severe leptospirosis [5].

Beside human infections, leptospirosis too could affect animals including pets. The wildlife like raccoon, squirrel, skunk, opossum or deer are infected when exposed to leptospirosis-infected pets [2]. *Leptospira* reportedly may survive in water or soil for months. Animal leptospirosis may significantly affect local farming activities. Due to reduced milk production and higher livestock abortions, it could cost national economy dearly [9]. Central American study revealed the occurrence of leptospirosis in bovine, porcine, equine and canine [10], and the infected domesticated and wild animals continuously excreted bacteria into environment. Leptospirosis is the best case instance of global ‘One Health’ approach, wherein it is essential to understand the animal-human-ecosystem interface with improved disease control strategies [7]. The ‘One Health’ approach may further be strengthened with regard to animal and

environmental health as well. In view of the growing concern of the ongoing COVID-19 pandemic and its long-term human healthcare fallouts, such relatively neglected pathological diseases may gradually and steadily become stumbling blocks in the pursuit to the 'One Health' drive. Thus, although Leptospirosis as the case disease is African-continent specific as of now, it may call for action and precautions at the global scale.

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