



Fighting Against COVID-19 with One Health Concept

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The coronavirus disease (COVID-19) pandemic is still ongoing worldwide, with an impact on almost all national health services and economies (1, 2). The emerging pandemic has revealed the inability and deficiencies of governments and health systems; therefore, the urgent need to implement a “one-health” approach has been emphasized by many authorities. Current findings suggest that the etiological agent of COVID-19 originated from bats and infected humans directly or with involvement of other reservoir host species, such as pangolin, in a wet market in Wuhan, China, where proper hygiene practices had not been maintained and different kinds of live animals were kept together. From this scenario, it is clear that a one-health approach is missing and should be established within public health and veterinary services with the involvement of researchers, academicians, and practitioners from both sides (3).

The “one-health” concept was formulated on the basis of the fact that human and animal health are interdependent and bound to the health of the ecosystems in which they exist. This concept aims to develop a collaborative approach for understanding the risks for human and animal health and the health of the ecosystem as a whole. For this purpose, the World Organization for Animal Health (OIE) is formulating intergovernmental standards for strengthening national veterinary services while working with several organizations such as the Food and Agriculture Organization (FAO) and World Health Organization (WHO), which play key roles in the human–animal–ecosystem interface (4–6).

Throughout history, human beings, who are at the most disadvantageous position against diseases and difficult natural conditions, have always had a high interest in nature. This interest has been transformed into excessive energy and food (especially protein) demands, with the increase in the human population. Consequently, excessive resource demand has brought forth many environmental disasters. This negative transformation in the ecosystem has not been limited to environmental disasters but has also been a modulator of many infectious diseases. The resulting epidemics caused the death of many people and animals on a regional and/or global scale, causing unpredictable economic loss and poverty.

The possible outcomes of climate change, agricultural intensification and increased demand for animal protein, changes in food values, increased use and exploitation of wildlife, destruction of habitats, extractive industries, travel, and transportation are affecting zoonotic disease emergence (7). Disease outbreaks with zoonotic characteristics can be caused by various pathogens such as bacteria, viruses, fungi, parasites, and prions. The transmission of these pathogens occurs through various ways, such as direct contact and/or indirect contamination (vector, food, water, soil, or air borne). Until now, many infectious diseases with known etiologies and epidemiologies have been described. The increasing risk of negative environmental transformation and mounting number of emerging diseases seriously threaten global health (8). As a matter of fact, the COVID-19 outbreak emerged owing to these increased risks and threatened and eventually turned into a global biological disaster.

At the beginning of the 19th century, some inventions such as pasteurization techniques and vaccination against diseases such as cholera and rabies; the use of antibiotics; sanitation concepts; and individual hygiene practices had opened new dimensions to control infections. This modern knowledge and development improved microbiology, virology, parasitology, and pharmacology as a science. A marked decrease in the incidence of communicable disease-related deaths was observed with the development of new vaccines, antibiotics, and some other developments in health sciences. During the same period, animal health and production greatly improved with the elimination and/or control of some diseases such as rinderpest, foot and mouth disease, and several zoonotic diseases (9).

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Zoonotic diseases have existed throughout the history of humanity, and currently, approximately 70% of the newly emerging or reemerging diseases are in this scope. In the last century, apart from the influenza pandemics that emerged in 1918, 1957, and 1968, no such epidemic had spread worldwide. Many diseases with the potential to cause epidemics have generally remained in the form of regional epidemics. The spread of diseases to other regions has been prevented by the close cooperation of the regional health authorities working in the field of animal and human health and by the timely intervention, technical assistance, and data sharing of the WHO (10).

As the COVID-19 pandemic has shown, the struggle and eradication of an infectious disease that has turned into a pandemic are accompanied by great difficulties. The disease has still not been eliminated from all parts of the world although ten months have passed since its emergence. At this point, the number of cases is still increasing and measures such as the imposition of a curfew and closure of shopping malls, factories, and schools continue to cause economic, social, and cultural regress. Considering the assumption that the first products of the ongoing vaccine and drug development efforts will be successful, they will still take almost one year to be ready for use and delivery throughout the world. It is also stated by the highest health authorities that the eradication of the disease will take time, and the situation may become more complicated with the mutation of SARS-CoV-2, which may become more contagious or pathogenic and vice versa during this time. On the other hand, the SARS-CoV-2 infection through the human–animal interface has already been reported in animals in some European countries such as the Netherlands, Spain, Italy, Sweden, Greece, Denmark, and the United States during the pandemic. In most countries, the first infections in mink farms were identified through contact tracing after confirmation of COVID-19 in symptomatic humans, followed by the isolation of SARS-CoV-2 from minks in Denmark. To prevent the infection, millions of minks were culled in connection with COVID-19 in Denmark (11).

Livestock markets called “wet markets” are commonly found in Far Eastern countries such as China, India, and Indonesia and other parts of the world. In Wuhan, China, where the disease first appeared, these wet markets were initially closed in the early days of the epidemic but were reopened after the epidemic eased and continued their activities. Open animal markets operated in an unhealthy manner have a market volume of 74 billion dollars in China alone. Therefore, necessary measures such as closing wet markets to eliminate the disease will cost these countries a significant amount (12).

Although a vaccine against COVID-19 might be useful to prevent epidemic episodes, other preventive measures should be implemented to achieve sustainable goals. In this regard, the “one-health” concept can play a key role. The following eight essential measures are recommended to reduce future outbreaks of COVID-19 and other pandemics (7).

1. **Scientific excellence:** Extensive scientific investigations and interventions are required to understand the epidemiological, social, economic, and ecological aspects, and the interface of environment, animal, and human health.

2. **Dissemination of knowledge:** Raising awareness and increasing knowledge about the risks of zoonotic and emerging diseases and their preventive strategies in all social communities worldwide.
3. **Governance:** Tripartite collaboration of the OIE, FAO, and WHO along with local governments as stakeholders in the implementation of interdisciplinary approaches focusing on one-health perspectives.
4. **Creating funds:** Underdeveloped and developing countries must have easy access to a common fund to implement the one-health approach to fight against pandemics. A governing body should monitor the whole program to optimize investments and reduce tradeoffs.
5. **Establishment of monitoring systems:** Effective means should be developed to regulate and monitor practices regarding zoonotic diseases that include epidemiology, nutrition, socioeconomic benefits, and sanitary measures from farm to fork.
6. **Sustainability:** Developing alternative approaches to practice sustainable agriculture that is not exploitative to the biodiversity and natural habitats, and enhancing management practices to control wildlife trade and consumption, and unsustainable agricultural practices.
7. **Biosafety:** Identifying key drivers of emerging diseases in animal husbandry, both in industrialized animal production (intensive husbandry systems) and small-scale production. This includes proper accounting of the cost of implementing biosecurity measures in production-driven animal husbandry/livestock production compared with the overall cost of One Health.
8. **Preservation of the sustainability of ecosystems:** Integrated approaches of seascape and landscape to ensure the sustainable coexistence of wildlife and agriculture to reduce the risk of transmission of zoonotic diseases. Governments and the private sector should take initiatives to save and restore natural habitats, conserve reduce habitat loss, and maintain ecological connectivity.

As a lesson that can be learned from the current COVID-19 pandemic, to be prepared for new pandemics and environmental disasters, interdisciplinary studies should be implemented as soon as possible and early warning systems should be established by professionals conducting joint studies in the fields of public, veterinary, and environmental health while participating in initiatives by worldwide organizations such as the WHO, FAO, and OIE in partnership with regional public health and other organizations.

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REFERENCES

1. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. *N Engl J Med* 2020; 382(13): 1199–207. [CrossRef]
2. World Health Organization. Coronavirus disease 2019 (COVID-19): Situation Report – 38. 22 November 2020. Available from: URL: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200303-sitrep-43-covid-19.pdf>.
3. Shereen MA, Khan S, Kazmi A, Bashir N, Siddique R. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *J Adv Res* 2020; 24: 91–8. [CrossRef]
4. World Organization for Animal Health (OIE), 2020. One health. Available from: URL: <https://www.oie.int/en/for-the-media/onehealth/>.
5. Amuasi JH, Walzer C, Heymann D, Carabin H, Huong LT, Haines A, et al. Calling for a COVID-19 One Health Research Coalition. *Lancet* 2020; 395(10236): 1543–4. [CrossRef]
6. World Health Organization. FAO-OIE-WHO Collaboration Sharing Responsibilities and Coordinating global activities to address health risks at the animal human-ecosystems interfaces: A Tripartite Concept Note. 2020. Available from: URL: https://www.who.int/influenza/resources/documents/tripartite_concept_note_hanoi/en/.
7. United Nations Environment Programme (UNEP) and International Livestock Research Institute (ILRI). Preventing the next pandemic: Zoonotic diseases and how to break the chain of transmission. Nairobi: UNEP and ILRI; 2020. Available from: URL: <https://wedocs.unep.org/bitstream/handle/20.500.11822/32316/ZP.pdf?sequence=1&isAllowed=y>.
8. İnci A, Doğanay M, Özdarendeli A, Düzlü Ö, Yıldırım A. Overview of Zoonotic Diseases in Turkey: The One Health Concept and Future Threats. *Turkiye Parazitol Derg* 2018; 42(1): 39–80. [CrossRef]
9. Wikipedia contributors. (2020, November 15). Timeline of medicine and medical technology. Wikipedia, The Free Encyclopedia. Retrieved 21:48, November 22, 2020, Available from: URL: https://en.wikipedia.org/w/index.php?title=Timeline_of_medicine_and_medical_technology&oldid=988905467.
10. Wikipedia contributors. (2020, November 21). List of epidemics. Wikipedia, The Free Encyclopedia. Retrieved 21:50, November 22, 2020, Available from: URL: https://en.wikipedia.org/w/index.php?title=List_of_epidemics&oldid=989854640.
11. Koopmans M. SARS-CoV-2 and the human-animal interface: outbreaks on mink farms. *Lancet Infect Dis* 2021; 21(1): 18–9. [CrossRef]
12. Beech P. “What we’ve got wrong about China’s ‘wet markets’ and their link to COVID-19”. The World Economic Forum COVID Action Platform. Online published at: 18 Apr 2020. Available from: URL: <https://www.weforum.org/agenda/2020/04/china-wet-markets-covid19-coronavirus-explained/>.