

COVID 19 and One Health

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Abstract

COVID 19 is caused by the SARS CoV2 virus and is raging across the length and breadth of all the countries of the world at present. A plethora of clinical manifestations are evident in this infection in man, but animals or wildlife and the environment also play a pivotal role in transmission of the infection and persistence and evolution of the virus. A three pronged One Health approach is hence very important for optimum epidemiological surveillance and management of COVID 19. In this article the authors have tried to explain and address these pertinent issues.

Keywords: One Health; COVID 19; Zoonotic; Pandemic.

Introduction

The present pandemic of COVID 19 originated from the wet animal markets in the Hubei province of China. Since then it has spread to every nook and corner of the World. Man, animals and environment, all are important for the disease process and virus survival. Environment may facilitate encounter between animals and man and lead to emergence of many infections like COVID 19. A holistic approach is hence essential for proper understanding of the infection.

Materials and Methods

Thorough and meticulous literature search was done to search for available literature. COVID 19 from human health viewpoint: By now the COVID 19 pandemic is in its third wave. Needless to say, it is very important from human health viewpoint since it spreads effectively from humans to humans

via aerosols and rarely fomites or by touching eyes or nose by infected hands.¹ It has led to appreciable morbidity or illness in man and also mortality and has caused tremendous economic losses.² Many many mutants and variants of the Novel Coronavirus have emerged by now. Some of these are variants of interest, while some are variants of concern. COVID 19 can affect multiple systems of the body causing protean manifestations like pneumonia, endotheliitis, myocarditis, arrhythmia, deep vein thrombosis, ischemic stroke and pulmonary embolism.³ It can necessitate some surgical procedures also. It has therefore become imperative that Doctors from all disciplines work in tandem to fight this ongoing pandemic.

COVID 19 from animal health or veterinary perspective: Since the SARS-CoV2 is believed to evolve from Bat Corona viruses and thence Pangolin lineage Corona viruses; a zoonotic perspective assumes some degree of importance.

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Genetic recombination possibly has played a very significant role in the evolutionary history of these viruses.⁴ Many types of animals also get the infection from humans occasionally. The virus has infected companion animals, wildlife, zoo and production animals, and also cats, dogs, tigers, lions, gorillas, white-tailed deer, mink, and other animals.⁵ Evidence suggests that the emergence of this virus may be a genetic spill over event due to the wet animal markets and others. There are many unsampled virus lineages circulating in horseshoe bats which have zoonotic potential due to the ancestral position of the human-adapted contact residues in the SARS-CoV-2 RBD (Receptor Binding domain).

COVID 19 from environmental angle: Fomites can be a vehicle for transmission of COVID-19 infection. The virus-laden droplets can remain on any surface for an appreciable time, provided the surrounding air is static and does not move.⁶ Novel corona virus can survive well on surfaces like plastics and metals. Hence inanimate surfaces and the environment in general can play a decisive role in infection transmission and need to be disinfected regularly. WASH or water sanitation and Hygiene and safe biomedical waste disposal practices can go a long way in prevention of COVID 19 infection and can form a part of a successful One Health approach from environmental perspective.⁷

The all-encompassing One Health viewpoint

The One Health (OH) approach is not new, but it assumes global importance in the context of COVID 19. One Health is an approach which recognizes that the health of humans is closely connected to the health of animals and also the shared environment. One Health is defined by the WHO as “an approach to designing and implementing programmes, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes”.⁸ One Health is not a new concept, but it has become relatively more important in the last decade.⁹

In the past, many infections like SARS, MERS and Swine flu have caused widespread outbreaks and epidemics. They arose due to coexistence or conflicts between man, wildlife and the environment. The One Health vision is important to study the emergence and natural history of all such infections. In fact, following the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003, the “One Medicine” concept transformed itself into a much improved all-inclusive approach of “One Health” that incorporated the direct effects

of environmental epidemiology on human and animal health.¹⁰ By now it is well established that COVID 19 emerged as Corona viruses evolved through hosts like bats and pangolins. However the reverse is also true.

Animals can also acquire COVID 19 from man. Especially, pet cats and animals belonging to the feline family are notably prone to acquire the infection from man. Mutations and genetic reassortments can occur readily between human and deer Corona viruses and is perhaps the reason for emergence of the recent Omicron variant. It is therefore important for the scientific fraternity to realize at this moment that the SARS CoV2 virus causing COVID 19 has to be eradicated from the infected human host, animals and also the environment. If not possible to eradicate, we all should learn to live with it whilst remembering that man, animals and the environment all have a role to play in its ecology, pathogenesis and persistence. Things like physical distancing, hand washing or hand sanitization and wearing face masks outdoors are also part of the broad One Health approach recognizing the environmental factors in COVID 19 transmission.

There are broadly four areas in which the application of OH has the potential to markedly improve the governance of infectious diseases in general and COVID-19 in particular. Firstly, a good integrated surveillance infrastructure and monitoring of the occurrence of infectious diseases in both humans and animals can facilitate detection of new infectious agents constituting similar genotypes across species and the monitoring of the spatio-temporal spread of those infections. This knowledge can help guide public and animal health officials in instituting appropriate response measures.

Secondly, application of the OH approach can enhance coordination and active collaboration among all the stakeholders who represent seemingly incompatible domains. Thirdly, the OH approach highlights the need of an effective institutional landscape. This can help facilitate adequate regulation of hotspots for transmission of infectious agents among animals and humans, like the live animal markets. Fourthly, integrated human and animal health laboratories can be set up, which will help strengthen the capacity to conduct integrated studies on COVID-19.¹¹ Finally, OH in practice stresses the need for equitable solutions for infectious disease challenges, indicating that policy response mechanisms and interventions need to be at par with the disproportionate disease

burdens faced by the vulnerable and marginalized populations.⁸ The One Health approach can bridge the gap between human medicine, veterinary medicine and environmental science and lead to a broader understanding of the virus and COVID 19 at large. Many courses can also be designed keeping this in mind. For example, a Government institute in India still runs the Master in Veterinary Public Health course for veterinarians to envisage a holistic approach towards public health as well as One Health.

Governments have now realized the importance and relevance of One Health in managing COVID 19, particularly with respect to the zoonotic potential of Corona viruses and the ability of such emerging viruses to jump species barriers. Recently the Department of Biotechnology, Government of India had organized a mega consortium on One Health with respect to COVID 19.¹² Scientists in Russia have started vaccinating animals vulnerable to COVID 19, like rabbits and mink. This will prevent the animals from severe COVID 19, and at the same time will thwart emergence of new mutants and variants that arise by reassortments between human and animal viruses.¹³ The FAO or food and agricultural organization is collaborating closely with the World Health Organization (WHO) and the World Organisation for Animal Health (OIE) in a FAO-OIE-WHO tripartite alliance to create and support One Health programmes in order to prevent disruption to food supplies and to manage COVID 19 in a better manner. India is home to a large proportion of the world's livestock farmers, but the lack of a good policy framework that validates the One Health approach in development and health policies is also perceived to be a major obstacle in eliminating poverty and poverty-related diseases.¹⁴

Discussion

Thus a One Health approach is the need of the hour for better understanding and management of COVID 19. Sir William Osler had promulgated the term "One Medicine", embracing both animal and human medicine way back in the 19th century. Dr Calvin Schwabe rejuvenated the same concept in the realm of veterinary public health.¹⁴ The Wildlife Conservation Society (WCS) coined the term "One World-One Health" in 2007 and suggested 12 recommendations (called the Manhattan Principles) that focussed on adopting a more holistic approach for preventing epidemic disease and maintaining integrity of the ecosystem. The healthcare system was found off guard in

managing the pandemic of COVID 19 due to the unpreparedness of the One Health program (15). With time the need to have a broader outlook and realize the importance of One Health for optimum response to COVID 19 and other future pandemics will be felt more. Pandemics like COVID 19 necessitate the proper implementation of the One Health Surveillance system (OHS) in order to focus on multi-sectoral, multidisciplinary, multi-institutional and multispecialty coordination, in all aspects of the response to outbreaks which might involve humans, animals, and their environment.¹⁶

Medical professionals, veterinarians and environmentalists need to get into the act together to produce a concerted effort to put in place a successful OH approach to manage and monitor COVID 19. If needed, new academic courses and events can be held or added to disseminate this very idea of OH in case of COVID 19, in the scientific community. However, it is also a fact that the most important barriers to such multi-sectoral action are often political, not technical.¹⁴

Conclusion

A One Health (OH) approach needs to be adopted now by all stakeholders for optimum management of COVID 19. This should not be neglected in the wake of the current pandemic. OH approach is the plausible approach of the future to manage and survey all upcoming pandemics and outbreaks due to such emerging viruses.

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