Concept of One Health and Future Prospective in India

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Abstract

The One Health Initiative is an effort by the scientific, animal health, public health, and veterinary communities to better understand biological hazards that might affect people or animals. It seeks to address the underlying problems of responding to infectious animal diseases when they cross the species barrier. One example is when humans get infected with an influenza virus strain from pigs. The goal is to advance our understanding of how human health and ecological systems are intertwined.

Keywords: *One Health; Human Activities; Geography; Ecology, India*

1. Introduction

Over the last three decades, it has become progressively obvious that a lot of novel, emerging zoonotic infectious diseases originate in animals, particularly wildlife, and that the primary drivers of their emergence are human activities, such as changes in ecosystems and land use, agricultural intensification, urbanisation, and international travel and trade. To understand the ecology of each developing zoonotic disease and to conduct risk assessments and build response and control strategies, a multidisciplinary and multi-disciplinary approach spanning animal, human, and environmental health is required (Mackenzie J.S., Jeggo., 2019; Yasobanta et al., 2019).

One Health is a philosophy that acknowledges that human health is inextricably linked to the health of animals and our common environment. One Health is not a new concept, but it has gained traction in recent years. This is because a variety of reasons have altered how people, animals, plants, and our environment interact. One Health

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is a method of developing and executing programmes, policies, and research in which diverse sectors collaborate to improve public health outcomes (Figure 1).

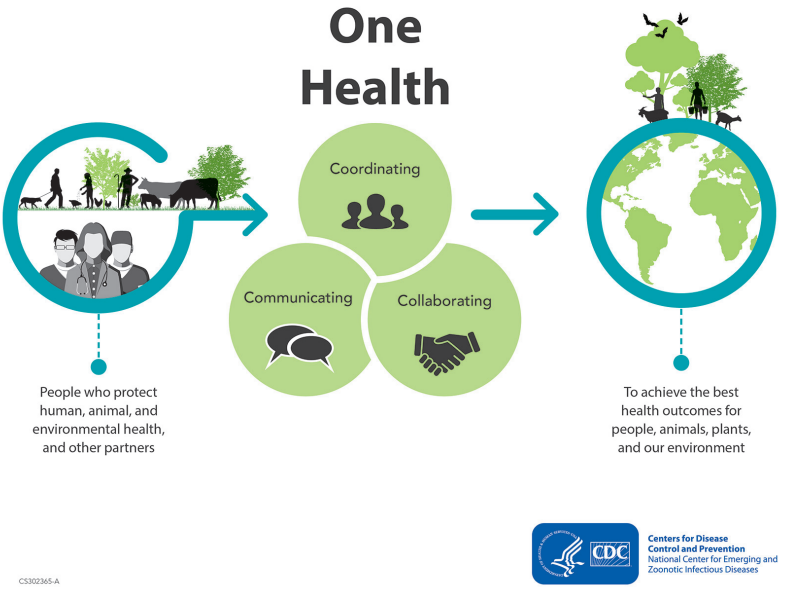

Figure 1: The Concept of One Health

(Source: CDC)

One Health is a philosophy that acknowledges that human health is inextricably linked to the health of animals and our common environment (Fig. 2). Human populations are increasing and spreading into new locations. As a result, more people interact with wild and domestic animals, including livestock and pets. Animals are vital in human life for a variety of reasons, including food, fibre, livelihoods, travel, sport, education, and friendship. Close interaction with animals and their environs increase the chances of disease transmission between animals and humans. Climate and land use changes, such as deforestation and intensive farming methods, have occurred throughout the planet. Changes in the environment and ecosystems might create new chances for illnesses to spread to animals. International travel and commerce have boosted the mobility of people, animals, and animal products. As a result, illnesses can swiftly

spread across national borders and throughout the world (Mackenzie J.S., Jeggo., 2019; Yasobanta et al., 2019).

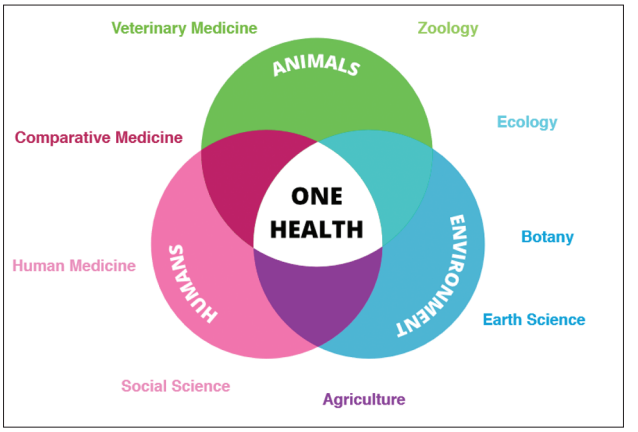

Figure 2: One Health as an intersection of human health, animal health, and environmental health.

(Source: wikipedia.org)

2. History of One Health

The unified concept of health has existed for a long time. In the 20th century, gaps in the prevention of zoonotic diseases were observed. In 1964, Dr. Calvin Schwabe in his book – 'Veterinary Medicine and Human Health' introduced the term 'One Medicine' and the Principles of Veterinary Public Health were also introduced. In 2004, Concept of 'One Medicine' changed to 'One Health'. The term 'One Health' was first coined in 2003–2004, in response to the occurrence of severe acute respiratory syndrome (SARS) in early 2003 and the resulting spread of highly pathogenic avian influenza H5N1, as well as a set of strategic objectives known as the 'Manhattan Principles,' formulated at a meeting of the Wildlife Conservation Society in 2004, which identified the link between human and animal health and the threats that diseases pose to food supply chains. These concepts were a vital step toward acknowledging the important implications of partnering, cross-disciplinary strategies for responding to emerging and resurgent diseases, and in specific, for including wildlife health as an important part of global disease prevention, surveillance, control, and mitigation.

3. Components of One Health – One World and its Relevance to COVID-19 Pandemic

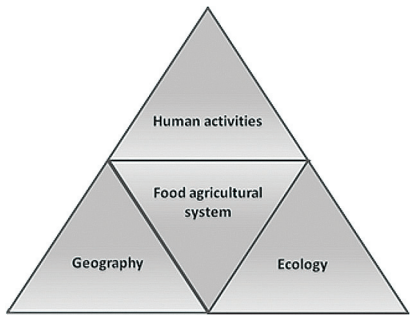

Figure 3: Components of One Health

(Source: Calistri et al 2013)

The interaction between humans, animals, and viruses may be shown as a tetrahedron (Fig. 3), with each of its four sides representing a distinct viewpoint that considers several components that play a major part in this interaction. COVID-19 caused by SAR-COV 2 transferred from animals and wet markets to people highlight the need for a supranational approach (the geographical component). From a single individual in Wuhan, China, to a pandemic affecting 220 nations and territories underlines the need to consider one health as a priority. All zoonotic illnesses (Nipah – fruit bats; COVID-19 – bats) – the involvement of animals and, more broadly, environmental variables in the propagation and maintenance of infections (the ecological component) underlines the critical importance of integrating veterinary and human medicine into a "one medicine" strategy, as well as the need for a multidisciplinary approach in general (the human activities component). Veterinary scientists and ecologists will need to collaborate with public health specialists and virologists to prevent future COVID-19 or similar outbreaks. The food-agricultural component highlights the necessity for a holistic perspective of the entire production chain, based on a "farm to fork" philosophy.

4. Scope of One Health

One Health encompasses zoonotic illnesses, antibiotic resistance, food safety and security, insect-borne diseases, environmental pollution, and other health issues that

affect people, animals, and the environment. As per One Health Commission (2021), some other broad areas include:

- Agricultural production and land use
- Animals as Sentinels
- Antimicrobial Resistance – a quintessential One Health issue
- Biodiversity/Natural Resources Conservation
- Biosurveillance for Disease prevention and response
- Changing Climate
- Comparative Biology/Translational Research/Diseases common to both animals and people, cancer, diabetes, obesity
- Convergence of human, animal, and plant health and the health of the environment
- Disaster preparedness and response
- Economics/Complex Systems, Civil Society
- Environmental Health/contamination detection and response
- Food and Water Safety and Security
- Global trade and commerce
- Human-animal bond
- Interprofessional relationships/sharing of knowledge (clinical and basic)
- Non-Communicable/Chronic Diseases
- Plant and Soil health
- Planetary Health
- Professional education and training
- Public policy and regulation
- Vector-borne Disease Prevention and Treatment
- Welfare/Well-being of animals, humans, planet
- Zoonotic Diseases that pass between animals and humans

5. Potential Outcomes from the One Health Approach

As per One Health Commission (2021), some key Potential Outcomes from the One Health Approach are mentioned below:

- More information exchange linked to illness detection and diagnosis, as well as education and research

- More multidisciplinary programmes in education, training, research, and established policy
- More illness prevention, both infectious and chronic diseases
- New medicines and treatment techniques for unmet requirements

6. One Health Context and Highlights in India

The detail of One Health Context and Highlights in India are represented in Table 1. Ministry of Health & Family Welfare (MoHFW) and Department of Health & Family Welfare (DHFW) have crucial responsibilities to play in central and state respectively. Ministry of Health & Family Welfare (MoHFW) have a role to play in health policies; regulatory functions and control of diseases and outbreaks etc.

Table 1: One Health Context and Highlights in India

One Health Component	Responsible Ministries	Functions
Human Health	**Central** - Ministry of Health & Family Welfare (MoHFW) **State** – Department of Health & Family Welfare (DHFW)	**MoHFW** – health policies; regulatory functions and control of diseases and outbreaks **DHFW** – Health care delivery; training of staff **Vertical disease control programs** – NACP; NTEP **National Center for Disease Control** - IDSP
Animal Health	Department of Animal Husbandry, Diarying and Fisheries under Ministry of Agriculture and Farmer's welfare	**Livestock production, preservation, protection from diseases.** Surveillance system for animal health (NADRS and NIVEDI)
Environment Health	Ministry of Environment, Forest and Climate Change	Conservation of flora, fauna, forests and wildlife; Control of pollution; Afforestation; **Protection of the environment and animal welfare**

7. Strengths, Weakness, Opportunities & Threats – OH in India

7.1 Strengths

Some of the strengths of One Health in India are as follows:

- Zoonotic committees established at national, state and district level
- Surveillance systems and vertical programs in place
- Well functioning systems at national, state and district level with community outreach
- Funding available to Animal Husbandry Department for study of zoonotic diseases

7.2 Weakness

- Lack of overall One Health Policy
- Draft National Health Policy does not address zoonotic diseases
- Coordination only during disease outbreaks
- No integrated disease surveillance; risk analysis and programmatic action
- Poor manpower and labs for Animal Health
- Integration with Environment Health weak

7.3 Opportunities

- Different models of collaborative work (individual researchers; solution-based and third party-based collaboration)
- Veterinarian posted in human health surveillance system (IDSP)
- Medical and Veterinary colleges under one University
- One Health hub as part of South Asia hub

7.4 Threats

- Integrated Disease Surveillance Programme (IDSP) and National Animal Disease Reporting System (NADRS) – parallel systems
- Unavailability of large-scale population data
- Lack of regulations on veterinary bio-medical waste management
- Lack of regulations on use of pesticides
- Lack of involvement of environment and agriculture department

8. Future One Health Collaboration Model for India

Globally, inter-sectoral cooperation is generally regarded as critical for improving and integrating health systems. A conceptual One Health collaboration model for India is represented in Figure 4 (Mackenzie J.S., Jeggo., 2019).

Figure 4: A Conceptual One Health Collaboration Model for India

As the intricacy of the health system has grown within the area of the One Health approach, there has been an immediate requirement for collaboration to successfully implement the One Health approach. Before embarking on any collaboration strategy, it is critical to get a thorough awareness of the local requirements and opportunities for cooperation. Furthermore, additional research on the system and contextual elements that influence OHC techniques is needed before they are implemented.

9. Conclusion

One Health is a critical idea that must be strengthened in India to avoid and manage future disease risks, such as fresh COVID-19 waves. The success of One Health is dependent on the three Cs: coordination, collaboration, and communication. India must take One Health seriously by developing a One Health Policy, forming an Inter-Ministerial Task Force on One Health, and supporting inter-departmental collaboration on research, integrated service delivery clinics, and reporting mechanisms.

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