

One Health: A Veterinary Perspective**Ananya Mohapatra¹, Sanghratna V. Bahire² and Bhalerao A. K.²**¹B.V.Sc and A.H, Orissa University of Agriculture and Technology (OUAT), Bhubaneswar, Orissa²Scientist, Training and Education Centre, ICAR- Indian Veterinary Research Institute, Pune (M.S.)**SUMMARY**

One Health is an emerging trans-disciplinary and collaborative approach of study of multiple disciplines at local, regional and national levels to achieve optimal health outcomes. This article traces its origins, its importance in the present context with an emphasis on its Veterinary outlooks, some of the major challenges it faces and its progress in Indian scenario. Public health is an integral part of human wellbeing and veterinarians are at the interface between animal health and human health. The major contributions of veterinarians to “One Health” are to control zoonosis, food-borne diseases, chemical and antibiotic residues, risks due to companion animals, to ensure safe animal production and their products, byproducts for human consumption, and to improve the health of people directly or indirectly.

INTRODUCTION

A 19th century German physician and pathologist ‘Robert Virchow’ suggested that, “Between animal and human medicine, there is no dividing line, nor should there be. The object is different but the experience obtained constitutes the basis of all medicine.” Although the outcomes of interactions that exist between humans, animals and ecosystems have influenced the course of human history over thousands of years, a holistic, trans-disciplinary and multi sectoral approach to health is a recently developed and growing field of study. The term ‘One Health’ was first used in 2003, associated with the emergence of SARS outbreak in 2003 which culminated in defined strategic goals and recognition of linkage between human beings, domestic animals and wildlife health along with its role in maintenance of a healthy and functioning ecosystem and economies as the ‘Manhattan Principles’. This is globally acknowledged and supported by Veterinary legislation and Organizations. The term ‘One health’ originated from the conventional idea of ‘One Medicine’ which considered the relevance of ecosystems in global public health and animal health development (Zinsstag et al., 2009). The most widely used definition of One health by USCDCP and One Health commission is, ‘One Health is defined as a collaborative, multi-sectoral, and trans disciplinary approach working at the local, regional, national, and global levels with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment’. The primary challenges that ‘One Health’ addresses are- Zoonosis, Food safety and Antimicrobial resistance.

Why One Health?

There is direct correlation between socioeconomic, environmental and ecological factors for emergence of diseases. Ecosystems are a major contributory factor of human as well as animal health. Industrialization, geopolitical problems, population explosion, ecotourism, changes in traditional livestock rearing practices and intensive agriculture are some of the major reasons leading to increase in proliferation of health risks including upsurge of zoonoses, antimicrobial resistance, food safety, pesticide, chemical residues and environmental pollution. The world is facing numerous emerging infectious and zoonotic diseases like Avian influenza, Swine flu, zoonotic Enterohemorrhagic E. coli and SARS in the recent years. To overcome this, there is a need for One Health to be collaborated with multidisciplinary research (Dhama et al., 2013). Disease dynamics determines the degree to which alterations caused by anthropogenic factors such as environmental pollution, climate change, forest fragmentation, habitat destruction, mechanization of agriculture and globalization of trade and business led to the occurrence of large-scale infectious outbreaks. As One Health re-conceptualizes health management and reckons diversity, redundancy, resilience and restoration of socio-ecosystems, it is the most appropriate method to address the challenges of this rapidly changing world. One Health is strengthened via collaboration between veterinarians, physicians, other scientific health workers and environmental scientists, promoting new initiatives, improving leadership and management skills, spreading information and attracting people to educate and make awareness among populations (Andrea, G., & Ákos, J., 2016).

Veterinarians Role in One Health –

The important functions of Veterinary Service in One Health are food safety, food security, quality assurance; veterinary medical care; veterinary preventive medicine, providing training for clean milk and meat production, vaccination, deworming and stress amelioration to avoid climate change effect on livestock. According to American Veterinary Medical Association, over 75 percent of emerging infectious diseases are zoonotic and 60 percent of human pathogens are zoonotic. According to the World Health Organization (WHO), 25% of the total disease burden worldwide is due to environmental hazards. A majority of bio-terrorism agents are also zoonotic. Recent outbreaks of Ebola, Avian Influenza, Swine Influenza, Chikungunya, SARS and Nipah due to environmental degradation and infected meat consumption are connected to zoonosis and food security. Increased incidence, geographic and host range of TB, Japanese encephalitis, West Nile fever, Malaria and Dengue fever; new variants of existing pathogens like HIV and Avian Influenza; and multiple antimicrobial resistant bacterial strains like MRSA and E.coli 0:157 cause apprehensions about global health and well-being.

Food security is inextricably linked with global health and sustainability. Some of the major diseases of livestock such as Avian Influenza, Swine Influenza, Brucellosis, Q-fever, Foot and Mouth Disease (FMD) and Bovine Spongiform encephalitis are a threat to global food security as well as global health due to their zoonotic nature. Unhygienic animal production and management leads to spread of diseases in animals and are ultimately transferred to humans through the food chain. We know that some of the major discoveries in the field of public health and medicine were made at the intersection between animal and human health, for instance, study of chicken cholera by Louis Pasteur and anthrax by Robert Koch gave rise to the 'Germ theory of disease' and the recent discovery of West Nile virus in the 1999 outbreak in New York city. In August 2011, the UN declared complete eradication of Rinderpest (RP), the second disease in history to be totally wiped out next to Smallpox. Indian government also undertook big campaigns to eradicate Rinderpest, FMD and Brucellosis. These examples revitalize the importance of simultaneous and combined efforts and resources at a global level to enhance global health. One Health concept is a rational approach to improve the lives of all species on the planet as animals and humans have a lot of common diseases and an integrated therapy would benefit all.

Challenges-

Some of the challenges that are encountered during implementation and execution of One Health programs at grass root level are-

- Lack of leadership and infrastructural resources
- Lack of reporting, sporadic data collection
- Overlooking role of migratory birds in disease transmission
- Marginalization of social, economic and legal components of One Health
- Absence of plant health as a full component, and
- Lack of bioethics.

If not addressed properly, these could create hurdles in the successful implementation of One Health programs.

One Health Initiatives in India-

Although 'One Health' concept is still in its infancy in India, some commendable initiatives are as follows-

- CDC is implementing 2 month and 3 year field epidemiology training programs for public health and laboratory personnel in India.
- A National Standing Committee on Zoonoses, Govt. of India (2005) to recommend policies, operational research, and inter-sectoral collaboration on the control of zoonoses.
- CDC and the National Center for Disease Control (2010) established the Global Disease Detection Regional Center in India to strengthen the Epidemic Intelligence Service of India, supporting emerging disease surveillance, improving preparedness and response to outbreaks, strengthening laboratory safety and biosafety, and improving zoonotic disease investigation and control.
- Inclusion of 'One World, One Health' concept in draft National Wildlife Action Plan.

- Posting of a Veterinary consultant at the State surveillance unit recognizing the mission statement of One Health initiative under Integrated disease surveillance program, NCDC.

CONCLUSION

Veterinary education must be introduced with the recent challenges and should forecast future trends and possibilities in One health paradigm. Public health is an integral part of society and veterinarians are at the interface between animal health and human health. Multi-sectoral, trans-boundary disease surveillance, monitoring and risk assessment should be regularly undertaken and cost effective, high quality and safe diagnostic methods should be provided. Judicious vaccination, prevention and control of vectors, minimizing host-vector interaction, economic prospects and remediation with minimal loss to biodiversity should be advocated. An interdisciplinary integrative approach among researchers and scientists from diverse backgrounds to enable scientific cooperation and fruitful exchange of ideas, protocols, strategies and good practices should be undertaken. As One Health moves beyond science and influences law, ethics and politics, the cumulation of all these influencing factors including building up political momentum, national campaigns, clinical interventions and interdisciplinary research are recommended to have a multiplicative effect.

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