

One Health in Action: National One Health Programme for prevention and control of zoonoses - Need, Strategy, Progress and Challenges

Simmi Tiwari^{1*}, Ajit Shewale¹, Aastha Singh¹, Tushar Nale¹, Dipti Mishra¹

¹ National Centre for Disease Control (NCDC), Delhi



*Corresponding author

Dr. Simmi Tiwari

Joint Director and Head, Centre For One Health

National Centre for Disease Control (NCDC)

Directorate General of Health Services

Ministry of Health and Family Welfare, Govt of India

drsimmi.tiwari11@gmail.com

Abstract

The concept of One Health has gained significant momentum to address the emerging risk at human- animal- environment interface. Recognizing that the health of these three interconnected domains is closely intertwined, the One Health approach offers a comprehensive perspective to tackle complex global health challenges. This article delves into the significance of One Health and its implications for promoting a healthier and sustainable future for all. The article takes a comprehensive review of ongoing efforts in these directions by various sector and describes the status and progress of the ongoing National One Health Programme for prevention and Control of Zoonoses. The article describes the strategies and Challenges faced by the programme to realize One Health Concept on ground.

Keywords: One Health, Zoonotic Diseases, National One Health programme for Prevention and Control of Zoonoses

Introduction

One Health has garnered notable recognition as a holistic strategy to comprehend and tackle emerging threats at the human-animal-environment interface. Acknowledging the interconnectedness of these three domains, the One Health approach provides a comprehensive viewpoint to address the global health challenges. This article explores the significance of One Health and its potential to foster a healthier and more sustainable future for everyone.

Understanding One Health

One Health can be defined as a collaborative and interdisciplinary approach that recognizes the interdependence of human, animal, and environmental health. It emphasizes the need for a systems-level understanding, acknowledging that diseases and health threats do not exist in isolation but are the result of intricate interactions between humans, animals, and their shared environment⁽³⁾. Historically, the human, animal, and environmental health sectors have often operated in isolation, leading to fragmented approaches in combating diseases and addressing health risks. One Health seeks to bridge this gap by promoting interdisciplinary collaboration, data sharing, and communication across various sectors, including human and veterinary medicine, public health, agriculture, ecology, and environmental conservation⁽⁴⁾.

The health of humans, animals, and the environment is fundamentally interconnected. Many infectious diseases, known as zoonoses, can be transmitted between animals and humans. Approximately 75% of emerging infectious

diseases affecting humans have an animal origin, with examples including Ebola, Zika, and COVID-19. By understanding the complex interactions between wildlife, livestock, and human populations, we can develop proactive strategies to prevent and control such diseases. Furthermore, environmental degradation and climate change have profound implications for health. Deforestation, habitat loss, and the encroachment of human settlements into previously untouched areas increase the risk of zoonotic disease transmission. Additionally, climate change influences the distribution of disease vectors, such as mosquitoes, impacting the spread of diseases like malaria and dengue fever. By considering these interconnections, the One Health approach provides a framework to mitigate these risks and safeguard human, animal, and environmental well-being^(7,10).

Benefits of the One Health Approach

1. Disease Prevention and Control: By recognizing the shared nature of diseases, the One Health approach emphasizes early detection, surveillance, and rapid response to disease outbreaks. Collaborative efforts between human and veterinary health sectors enable better monitoring and control of zoonotic diseases, reducing the likelihood of pandemics and improving public health outcomes.

2. Antimicrobial Resistance: One Health recognizes the overuse and misuse of antibiotics in both human and veterinary medicine as a significant concern. By

fostering collaboration, One Health advocates for responsible antimicrobial stewardship, promoting the judicious use of antibiotics in both human and animal health settings, thus combating the growing threat of antimicrobial resistance.

3. Environmental Sustainability: The One Health approach underscores the importance of sustainable environmental practices. By addressing the root causes of environmental degradation, such as deforestation, pollution, and climate change, we can mitigate the emergence and spread of infectious diseases, preserve biodiversity, and ensure the long-term health of our planet.

4. Research and Innovation: One Health encourages interdisciplinary research collaborations, leading to new insights and innovations. By integrating knowledge from various fields, we can develop novel diagnostics, vaccines, and treatments for both human and animal health, improving health outcomes for all species.

One Health and Pandemic Preparedness

The COVID-19 pandemic has brought to the forefront the importance of adopting a One Health approach to global health emergencies. This novel coronavirus, like many other infectious diseases, demonstrates the intricate interplay between humans, animals, and the environment. Understanding the lessons learned from COVID-19 and embracing the principles of One Health can enhance our preparedness and response to future pandemics.

The One Health approach emphasizes proactive measures to identify and prevent cross species pathogens transfers and zoonotic spill over events. This involves addressing the underlying drivers of disease emergence, such as, deforestation, wildlife trade and habitat destruction. By implementing sustainable land-use practices, preserving biodiversity, and promoting responsible animal husbandry, we can reduce the likelihood of zoonotic diseases crossing into human populations. Furthermore, promoting public awareness and education about zoonotic diseases and their prevention can empower individuals to adopt safer practices and behaviours. Encouraging responsible pet ownership, advocating for the regulation of wildlife trade, and implementing strict food safety standards are crucial steps in preventing future zoonotic outbreaks.

The One Health approach encourages interdisciplinary research and innovation to tackle global health challenges. COVID-19 has highlighted the need for accelerated research efforts, including the development of diagnostics, therapeutics, and vaccines. By fostering collaboration between human health researchers,

veterinarians, and environmental scientists, we can pool expertise and resources to expedite the discovery of solutions. Additionally, integrating animal health surveillance systems into existing human health surveillance networks can facilitate early detection of potential threats. This collaborative approach can also aid in the development of broad-spectrum antivirals and vaccines that protect against multiple coronaviruses, mitigating the impact of future outbreaks⁽⁵⁾.

Pandemic preparedness is a global concept that requires strong international cooperation and governance. The One Health approach emphasizes the importance of collaborative partnerships, data sharing, and resource allocation among nations. International organizations, such as the World Health Organization (WHO), World Organisation for Animal Health (OIE), and the United Nations Environment Programme (UNEP), play a vital role in facilitating coordination, standardizing guidelines, and promoting best practices in One Health pandemic preparedness⁽⁶⁾.

One Health in Indian Perspective

India, with its vast population, diverse ecosystems, significant livestock and wildlife populations, faces unique public health challenges. To effectively address these challenges, the integration of the One Health approach into the country's public health system is of paramount importance. This article explores the significance of incorporating One Health principles into India's public health framework and the potential benefits it can bring to the nation's well-being.

Integrating One Health into India's public health system would strengthen disease surveillance and response mechanisms. By establishing a collaborative framework involving human health, veterinary services, and environmental agencies, early detection and timely control of disease outbreaks can be achieved. This proactive approach enables rapid deployment of resources and interventions to prevent the spread of diseases from animals to humans and vice versa^(2,11). For instance, a One Health approach to combat diseases like avian influenza and Nipah virus would involve close coordination between veterinary departments, public health agencies, and wildlife authorities. This collaboration facilitates efficient monitoring of disease patterns in animals, early detection of potential threats to human health, and the implementation of preventive measures to minimize the impact of outbreaks^(3,4,5,10,12).

Key Stakeholders for One health

Currently major stakeholders in India in One Health includes Ministries of Health, Agriculture, Animal Husbandry, Environment and Forest, Science and Biotechnology, Water and Sanitation Human Resource,

etc. and organizations such as NDMA, DCGI, FSSAI etc.

One Health initiatives in India

India also echoes the global voice acknowledging the importance of “One Health” and paid a particular heed to make One Health Approach as an inbuilt principle in its national programmes for e.g., There are several programmes and initiatives that are currently run by different ministries and stakeholders with One Health approach with well-defined subject specific objectives and strategies.

For zoonosis, ICMR and ICAR have developed collaboration for joint research priorities. Ministry of Science and Technology has proposed to have a One Health roadmap for India with the Ministries of Health, Agriculture and Environment, Forest and Climate Change.

National Disaster Management Authority (NDMA), NCDC, Emergency Medical Relief (EMR), IHR division had played important role in crisis situations especially outbreak response and managements e.g. outbreaks of Zika, Nipah and AMR related containment.

FSSAI have taken several initiatives under Swasth Bharat initiative for generating community awareness on eating habits of people. NDMA and Ministry of Health are working on preparation and implementation of action plans on climate change related events.

“National institute for One Health” in Nagpur is an upcoming key pillar for leading One Health Research under the aegis of ICMR.

National Programme for AMR containment was launched during 12th five-year plan (2012-2017) and currently strengthening state medical college labs in 26 States/UTs. The programme focusses to establish a laboratory-based AMR surveillance system in India and to strengthen infection control practices. Under the programme in April, 2017 an Inter-ministerial consensus was signed named as Delhi Declaration on AMR to adopt a holistic and collaborative approach for AMR containment in the country.

National Programme for Climate Change and Health was launched by MoHFW under National Health Mission in 2019 to create awareness among general population, health care providers and Policy

makers about the impact of changing climate on human health and to strengthen healthcare system to reduce illness/diseases due to varying climate.

National Action Plan for Dog Mediated Rabies Elimination from India by 2030 launched jointly by Ministry of Health and Family Welfare and Ministry of Fisheries, Animal Husbandry and Dairying in 2021 is another endeavour to address the rabies menace in the country by adopting strategic One Health intervention both for human and animal health sector.

National One Health Mission was set up upon approval of The Prime Minister’s Science, Technology and Innovation Advisory Council (PM-STIAC) to coordinate, support and integrate all the existing One Health activities in the country and fill any existing gaps. One Health Mission have several undergoing initiatives such as targeted research and development, database integration, streamlining of regulatory and approval processes and Integration of the efforts into existing programmes to prevent further siloes.

National One Health Programme for Prevention and Control of Zoonoses a hundred percent centrally funded programme was launched in 2013 by Ministry of health and family welfare with NCDC as its nodal agency to implement and coordinate the activities under the programmes. The key objective of the programme was to strengthen the intersectoral coordination between human, animal, and environmental sectors. Over the year the programmes has expanded its vision to institutionalize the structural mechanism for one health in the country at national, state district, block and up to village level with active community engagement. The programme has missioned to bring all stakeholders from policymakers makers till front-line workers with shared vision and common goal on strategic One Health Platform. The ultimate goal of the programme is protecting communities and minimizing socioeconomic losses due to emerging and re-emerging zoonotic threats.

The stated objective of the programmes is to operationalize “One Health” mechanisms for prevention and control of Zoonoses through strengthening Inter-sectoral Coordination among all stakeholders at the National, State, and District and below district level. The key strategies to achieve the objective is conceptual existing surveillance systems in all sectors, roping in veterinary and wild life institutes as regional coordinators joint capacity building

programmes, networking and mapping laboratory resources for cross sectoral efficient use of resources for zoonotic pathogens within the ambit of scientific protocols and preserving and protecting the sectoral priorities.

The programme has six broad components and many sub components as –

1. Institutionalize One Health mechanism at National, State and district level
2. Integrated Manpower development through Capacity Building programmes through Regional Coordinators network & partner institutions.
3. Establishing an Integrated Surveillance mechanism for one health by digital interlinkages of existing portal through APIs in different sectors and enhancing use of artificial intelligence and data modelling for predictive analytics for early warning signals. This component envisages establishing a network of sentinel surveillance sites on Zoonoses across the country.
4. Integrated Community Outreach programme activities interlinked with sentinel surveillance sites and regional coordinators
5. Advocacy and Risk Communication activities for target and at-risk population
6. Undertaking multidisciplinary operational research activities in collaboration with partners organization.

The programme is being implemented in all 36 States/UTs. At National level various committees have been formed to monitor the progress of these programme for e.g. standing committee on zoonosis and diseases specific national technical advisory group are constituted to advise the programme division on various technical aspects of the programme. The programmes have devised and formulated operational guidelines for its various components and has been able to sensitize the concerned stakeholders as evidenced by an active networking and partnership with many institutes and universities both in health and veterinary sector. Constitution of State and district level zoonoses committees with representation of all concerned stakeholders has been able to draw the attention of state governments to address the zoonotic diseases with One Health approach.

The expanding network of sentinel surveillance sites for zoonoses with integrated community outreach activities, joint training of medical and veterinary professionals, state and district level rapid response teams on joint risk assessment and outbreak investigations has been able to improve intersectoral collaboration and hence bridging the knowledge gaps

among various sectors. Operational and applied research activities for Zoonoses are consistently undertaken by regional coordinators and partners organizations. The programme is attempting to create an integrated web/digital portal for zoonotic pathogens which would be a joint IT platform for data sharing on agreed parameters between concerned sectors such as health (IDSP), veterinary (NLM/NADRS) and Climate data (IMD). This will enable to develop a Real-time alert mechanism for zoonotic diseases and timely detection, effective prevention, and public health response for impending outbreaks.

Joint training is conceptualised to educate ASHAs, AWW, and Paravets and Field level Wildlife workers through joint training session and awareness programme on zoonoses and reverse zoonoses. Creating awareness on zoonoses among farmers and livestock handlers through Gram Sabha and Village committee through mass education and Inter-personal communication is a strategic intervention under the programme to foster the one health concept at grass root level.

Challenges

Implementing the One Health approach in India faces numerous challenges stemming from various factors. Firstly, the divergent priorities across different sectors pose a significant hurdle. Each sector, be it human health, animal health, or environmental sector, operates with its own set of priorities and objectives, often leading to fragmented efforts. Additionally, there is a lack of coordinated efforts among stakeholders and a deficiency of necessary policies to facilitate inter-sectoral collaboration. India's pursuit of comprehensive health practices, encompassing human, animal, and environmental health, faces significant challenges due to legislative barriers. There is a need to integrate and strengthen legislation for development of comprehensive One Health regulatory framework that integrates laws across human health, animal health, and environmental protection to enforce robust surveillance systems and timely reporting that is imperative for effective One Health practices.

Another critical issue is the minimal data sharing between sectors, hindering comprehensive and effective response to health challenges. Public awareness about the interconnectedness of human, animal, and environmental health remains low, further exacerbating the problem. Insufficient technical capabilities, especially in rural areas, and logistical constraints pose additional barriers. Furthermore, India's rich biodiversity and complex wildlife sector present unique challenges in

disease surveillance and management. Overcoming these challenges requires concerted efforts from policymakers, healthcare and veterinary professionals, researchers, and the public to foster a holistic approach towards health management.

Conclusion

Although One health is well conceptualized in the above national programme but realization of the concept seems impractical at times due to many challenges such as lack of policy framework, sectoral silos and disparate human and animal disease reporting and surveillance systems. There are significant gaps in the required infrastructure and human resources in all sectors particularly in veterinary and wild life sector. Inadequate resource allocation, lack of SOPs for systematic communication, inherent differences in disciplinary training, knowledge deficits and inter and Intra hierarchical coordination challenges further complicate the situation. However, with the lessons learnt with covid pandemic, there is global movement to incorporate the One Health Principle in all policies and programmes. The recent launch of Joint Plan of Action on One Health by UN quadripartite (WHO-OIE-FAO-UNEP) and systematic dialogue on One Health at G20 and UK G7 forum has resulted in significant sensitization the stakeholders to obtain the highest level formal mutual cooperation agreements on “One Health” activities. Triggered with the global momentum, the National One Health programme for Prevention and Control of Zoonoses, a policy driven initiative by Government entails a bright scope of realizing the concept of one health and has the potential to improve overall public health outcomes and promote sustainable development.

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