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Short report

One Health in India: A Critical Analysis

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Abstract

'One Health' is an integrated and unifying approach that aims to address the interconnectedness of human, animal, and environmental health. In developing countries like India, the challenges of implementing 'One Health' from theory to practice are unique. The lack of transdisciplinary coordination, limited awareness of inter-sectoral dependencies, and inadequate research and economic funding are significant barriers of implementation. Specifically, the absence of data sharing between veterinary, food, and the environmental sectors with human health practitioners hinders the development of effective preventive programs for emerging and reemerging infections. This has a significant impact on the evolution of antimicrobial resistance. Thus, international collaborations are crucial to provide technical expertise, financial support, and capacity building to facilitate the successful adoption of One Health in India.

Keywords: One Health, India, coordination, barriers.

The Evolution of One Health

The concept of 'One Health' first came into prominence in 2003-2004 during the emergence of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic (Ronald., 2013). Calvin W Schwabe, regarded as the father of veterinary epidemiology had suggested the integrated and cross-disciplinary relationship between human and animal health as early as the mid-20th century (Cowen et al., 2016). He highlighted the importance of effective communication and collaboration between members of his profession and practitioners of human medicine. Even though the concept of 'One Health' has been around for a while, it has recently become increasingly clear that the spread of novel infectious zoonotic diseases is associated with human activities. Population movements including immigration and acculturation, rapid industrialization, and intensification of agricultural land use have brought irreparable changes to the ecosystem that cause an easier human-wildlife interaction. This interconnection between animals, humans, and shared environment has emphasized the need to focus on the practical concepts of One Health.

Global Initiatives and Challenges

Global partners including the Food and Agriculture Organization (FAO), United Nations Environmental Programme (UNEP), World Organization for Animal Health (OIE), and World Health Organization (WHO) established the One Health High Level Expert Panel (OHHLEP) that sought to find ways to address challenges unique to implementing One Health in practice. In the absence of a uniform definition of One Health, there are diverse interpretations of the concept that has significant differences in scope and practice. OHHLEP has tried addressing this challenge by developing a consensus around the working definition of One Health with insights from various disciplines, stakeholders, and partner organizations. For the broader global audience, the 4Cs: Communication, Coordination, Collaboration, and Capacity Building are pivotal in taking One Health from theory to practice (Zhou et al., 2024). The fundamental principles of multi-sectoral equity, social parity, inclusion, and maintenance of socio-ecological equilibrium need to be highlighted across all involved disciplines to successfully implement the One Health view. To effectively maintain the socio-ecological equilibrium and to promote the balance between human-animal-shared environment relationships, stewardship of human behavior changes is necessary. However, cooperation and collaboration to promote these changes across the various sectors is challenging.

The One Health approach for disease prevention and health promotion is not restricted to limiting the spread of zoonotic diseases or combating the emergence of highly resistant bacterial infections secondary to widespread antibiotic use. Thus, the complexities of implementing One Health in practice are significant. While food safety, antimicrobial resistance, climate change, and resource allocation are wider topics that need to be addressed in the involved and specific sectors, the difficulty of increasing shared intersectoral responsibility is undeniable. To address these complex global health challenges, the entire spectrum of health improvement needs to be accounted.

Detection, preparedness, and recovery from the aftermath of a public health emergency is different in the developed and developing worlds. Correspondingly, the challenges of implementing One Health in practice are context specific. Significant global barriers for implementing One Health include lack of political will, absence of multi-sectoral policies, economic disinvestments, and low levels of interest among healthcare workers to adopt the concept.

One Health in India: A unique perspective

A recent systematic review that evaluated the barriers and enablers of One Health in developing countries identified lack of specific skills, lower wages, inadequate training, and small numbers of staff as significant factors that hinder implementation (Yopa et al., 2023). Like other developing countries, the challenges of implementing One Health in the Indian context are unique. Some challenges include incomplete surveillance, insufficient funding, close contact of the population with domestic and wild animals, and climate-sensitive livelihoods that expose people to extremes of weather.

India has an integrated surveillance system that looks specifically at the spread of infectious diseases. Even though there are numerous laboratories that evaluate various clinical and microbiological specimens, there is a definitive lack of coordination across the disciplines. In most cases, there are inappropriate storage conditions and significant delays in transporting the various biologic samples that are collected in fields. Next, the absence of sufficient economic and research funding for multidisciplinary projects makes it significantly difficult to understand how diseases affect humans, animals, and the environment. In addition to the underfunding, Indian rural health facilities lack appropriate diagnostic resources and trained personnel. Inadequate awareness of the concept of One Health among various stakeholders and conflicting priorities often hinder implementation. As of 2021, the Indian Federal Government spent only 1.2% of the gross domestic product on public healthcare, which is also a significant factor that hinders the application of the integrated One Health approach at community, regional, subnational, and national levels.

History of Integrated Surveillance in the Indian Veterinary Sector

In 1989, Government of India (GOI), under bilateral collaboration with the European Union launched the National Project for Rinder Pest Surveillance and Monitoring (NPRSM) to eradicate rinderpest. Consequently, the 'National Project on Rinderpest Eradication (NPRE)' was launched in India in 1990. Implementation began in May 1992 and the project adopted the "Office International des Epizooties (OIE Pathway)" towards rinderpest eradication in 1993-94. On May 25, 2006, India was declared free from rinderpest infection.

The Integrated Disease Surveillance Project (SP) was launched by the Ministry of Health and Family Welfare in November 2004 with the aid of the World Bank. It was a decentralized, state-

based surveillance program in India. Similarly, the All-India Network Program-Blue Tongue was a collaborative Indo-United Kingdom project. The project was coordinated by The Pirbright Institute (TPI), London and Indian Council of Agricultural Research (ICAR). Peste des Petits Ruminants (PPR) Control Programme (PPR-CP), launched in 2014 with GOI assistance aimed to control PPR in sheep and other livestock. This program was extended to all the states under the 12th Five Year Plan (2012-2017).

Surveillance of animal diseases: Indian scenario

Brucellosis Control Program (BCP): Brucellosis causes an estimated annual economic loss of 350 million Indian National Rupees (INR)/year. Thus, BCP was introduced by the GOI in the 10th Five Year Plan (2002-2007). This program was earlier known as the National Control Program on Brucellosis. BCP now includes calfhood vaccination of female calves of 6 - 8 months of age in all Indian states by cotton strain-19 vaccine, biannual village level screening of pooled milk samples, and mass screening and castration of infected bulls.

Foot and Mouth Disease Control Program (FMD-CP): Foot and Mouth Disease (FMD) causes an estimated economic loss of INR 18,000 crores annually in India. FMD-CP was started in the 10th Five Year Plan in 54 districts of India covering 30 million cattle, buffaloes, and pigs. The program was funded by the GOI for the cost of vaccine manufacturing, maintenance of cold chain, and other logistic support needed to undertake vaccination. The state governments provided other infrastructural help and manpower. By mass vaccination (twice a year) India aims to achieve freedom from FMD by 2030.

National Animal Disease Referral Expert System (NADRES): NADRES is an active animal disease surveillance system that collects data through village surveys and utilizes software and more recently artificial intelligence to improve early warning to farmers and policy makers about various zoonoses.

The National Animal Disease Reporting System (NADRS): In India, animal disease surveillance data are collected and reported through the National Animal Disease Reporting System. It was initiated by Departments of Animal Husbandry, Dairying and Fisheries (DADF) during 2010-11 through the National Informatics Centre (NIC). This web-based platform consolidates the incidence of 13 common livestock diseases and aims to assess the temporal and spatial relationships of various risk factors to design specific preventative measures. In addition, around 143 animal diseases scheduled in the Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009 are also included in this reporting system. Even though this system collects information from several state and central government laboratories including veterinary colleges across the nation, an integrated surveillance system that aims in early detection of remerging zoonoses in the Indian human population is lacking (Chethan Kumar et al., 2021). Animal Quarantine and Certification Services (AQCS): The main objective of this scheme is to issue export health certificates as per international norms for livestock and

livestock products, that are exported from India. Four Animal Quarantine and Certification Service stations, one each at New Delhi, Chennai, Mumbai and Kolkata have been established.

Veterinary Capacity Building: Indian Scenario

At present, there are 70 veterinary colleges in India that offer Bachelor of Veterinary Science (BVSc) and Bachelor of Veterinary Science and Animal Husbandry (BVSc & AH) degrees. 56 of the colleges are recognized by the Veterinary Council of India (VCI) and 14 are provisionally recognized. Veterinary education in India is regulated by the Indian Veterinary Council Act (1984) and the current minimum standard for veterinary education is formulated by the VCI. As of March 31^{st,} 2023, there were 81,938 registered veterinary practitioners in the country (*Veterinary Council of India* 2023). In West Bengal, there were only 2,661 registered veterinary practitioners. Thus, only one qualified veterinarian is available per 10–15 villages. This number highlights the acute shortage of veterinarians in the country (Rao et al., 2015).

Assistance to states for Control of Animal diseases (ASCAD): Assistance is provided to state governments by the GOI to control economically important livestock and poultry diseases by immunization, strengthening existing state veterinary biological production units (quality control center located in Uttar Pradesh), disease diagnostic laboratories (located in Itanagar, Bangalore, Pune, Kolkata, Jalandhar and Guwahati), holding workshops/seminars and in-service training to veterinarians and para veterinarians. The program is being implemented on 75:25 sharing basis between GOI and the states with the following objectives: a) vaccination against economically important diseases of livestock and backyard poultry; and b) prioritizing activities based on the prevalence of diseases and losses to farmers.

Challenges in India

The lack of shared and effective governance along with inadequate political will and commitment makes it hard for the percolation of One Health practice to grass-root levels. First, in the rural parts of the country, close contact of people with domesticated and wild animals increases rapid spread of zoonotic infections. Even after significant socio-economic progress and use of vaccines and antibiotics, infectious diseases continue to cause a significant healthcare burden. Second, individuals living in urban India are exposed to high levels of air pollution with the Air Quality Index (AQI) often exceeding “severe” levels. Third, India owing to its unique geographic location, is particularly vulnerable to climate change.

The National Action Plan on Climate Change (NAPCC) is a comprehensive plan designed by the GOI to specifically address policies and programs to help the nation adapt to climate change. The plan primarily addresses the impact of climate on human health and aims to identify the various mitigating factors that reduce the direct and indirect effects of extremes of weather. NAPCC has

identified eight core "national missions" to address the health-related aspects of climate change including preparing an action plan, identifying sustainable strategies, and promoting capacity building (Ningsih et al., 2024). This plan, however, neglects the effect of climate change on animals and environmental health. This fact is significant in the Indian context, given the close contact of the human population with animals and environment.

The need for transdisciplinary coordination and collaboration is thus essential to address the rural and urban healthcare needs. However, there are significant gaps in both research and practice related to the One Health concept that are specific for the Indian subcontinent. In some bigger cities, there are few collaborative projects between human health and animal medicine practitioners, however, there is a serious lack of involvement in other sectors. In the absence of a collaborative platform that includes input from stakeholders for various disciplines, finding opportunities for equitable and holistic solutions remain difficult.

Additional Considerations

In India, capacity building for promoting One Health practice remains significantly difficult. For the country to work towards a sustainable health delivery system, implementing One Health in practice is essential. Since South Asian countries like India contribute to the main global burden for remerging diseases, promoting multisectoral coordination in this region is fundamental. For preventing the spread of emerging zoonoses and controlling epidemics and pandemics, One Health needs to be included in healthcare curriculum. Even though the principles of One Health mandate that physicians, veterinarians, wildlife experts, environmentalists, paramedical staff, and the public work in unison, the lack of multi-disciplinary training make implementation challenging.

Like other developing countries, the lack of awareness and training among Indian health professionals of the intersection between animal, human, and environmental health is noteworthy. There is almost no capacity building plans or training programs that aim to integrate One Health into practice. Recently, however, the National One Health Mission, an initiative by the Indian Council of Medical Research and The National Center for Disease Control (NCDC) has outlined various initiatives that aim to incorporate various sectors to address health, productivity, and quality services. However, in the absence of long-term plans and training programs that specifically aim to integrate One Health, these initiatives are bound to fail. Another major hurdle is that in the absence of adequate government support, One Health training programs in countries like India remain heavily dependent on donor funding. Thus, keeping in mind the effects of globalization, population movements, and the interconnectedness of health outcomes, the current crop of Indian healthcare students need training specific to One Health practice.

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