Status Paper

Addressing zoonotic threats: the role of One Health approach

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ABSTRACT

The intricate relationships between animals, humans and the environment have far-reaching consequences, yielding benefits as well as facilitating the spread of zoonotic diseases and multifactorial chronic conditions. The escalating threats of antimicrobial resistance and environmental pollution necessitate an inter-disciplinary and inter-sectoral approach. This is precisely where the concept of One Health comes into play, uniting experts from public health, healthcare, forestry, veterinary medicine, environmental science and related fields to optimize health outcomes for humans, animals and the environment. By addressing these challenges and harnessing the full potential of the One Health approach, a nation can ensure a healthier future for its human, animal and environmental populations. Effective implementation will require sustained commitment, coordination and investment from all stakeholders. the review outlines the general One Health framework encompassing engagement, assessment, planning, implementation and monitoring/evaluation, designed to optimize resources and enhance multi-sectoral collaboration.

Keywords: Zoonotic diseases; One Health; environmental pollution; GOHF

INTRODUCTION

The One Health approach seeks to achieve optimal health outcomes by cooperative efforts at local, regional, national and international levels (Leboeuf 2011). It acknowledges the complex relationships that exist between people, animals, plants and their shared environment (Destoumieux-Garzón et al 2018). In the modern world, where environmental deterioration and climate change contribute to the rise of infectious and non-infectious diseases, this strategy is essential (Dye 2014). Over 60 per cent of human infections are zoonotic diseases, which are a serious hazard, especially in nations like Ethiopia, Nigeria, Tanzania and India where they are a major cause of illness and mortality (Rahman et al 2020). An estimated 2.2 million people die and 2.4 billion cases of 13 zoonoses occur each year, according to International Livestock Research Institute (Narayan et al 2023). The One Health approach, which is a conventional strategy against zoonotic threats like SARS, Ebola and emerging infectious illnesses, has received international concern in response to this growing problem (Dye 2014). Inter-sectorial cooperation, flexibility in responding to local requirements, strong stakeholder engagement, operationalizing intricate health systems and resolving pre-existing issues are all necessary for successful implementation (Rahman et al 2020). By using an all-encompassing strategy, the dangers of zoonotic illnesses can be reduced and the best possible health outcomes for people, animals and the environment can be encouraged (Aggarwal and Ramachandran 2020).

General One Health framework (GOHF)

It is a systematic, five-step process created to apply the One Health approach to zoonotic disease control and prevention (Bag and Sengupta 2024). The framework offers a systematic approach to optimizing resources, fostering better collaboration between the fields of environmental, animal and human health and

boosting health security in general. Fundamentally, the GOHF focuses on aligning stakeholders at different levels viz local, national and international along with strengthening capacity through multi-sectoral collaboration (Ghai et al 2022). The framework also includes a toolkit that gathers and arranges already available resources, providing a step-by-step diagram to assist nations or areas in locating and efficiently utilizing pertinent data and tools during implementation.

Step 1: Engagement

It involves identifying and involving important stakeholders from areas including environmental science, wildlife, agriculture and public health in order to encourage cooperation and a common understanding of the One Health concept. To guarantee ongoing support and resource allocation, stakeholders collaborate to identify zoonotic diseases of national concern in order of priority and to develop a government commitment to utilize the One Health framework.

This integrated approach fosters knowledge sharing, enhances surveillance and monitoring and supports evidence-based decision-making. By leveraging the collective expertise and resources of diverse stakeholders, countries can strengthen their capacity to prevent, detect and respond to zoonotic disease outbreaks.

Step 2: Assessment

Its main goal is to comprehend the existing constraints and discrepancies in infrastructure, capacity and resources both within and between the sectors involved in the control of zoonotic diseases. In order to identify strengths, weaknesses and areas for improvement, this stage entails mapping the current infrastructure, creating a baseline for zoonotic disease surveillance and doing gap and economic analyses.

By conducting this thorough assessment, stakeholders can identify opportunities for inter-sectoral collaboration, leverage existing capacities and address critical gaps in zoonotic disease management. Ultimately, this informed approach enables countries to develop effective, sustainable and resilient systems for preventing and responding to zoonotic disease outbreaks.

Step 3: Planning

A multi-sectoral strategic plan is essential for tackling priority zoonotic diseases through a unified approach, leveraging the strengths of public health, animal health, environmental and other sectors. This comprehensive plan coordinates disease surveillance and response, enhances public awareness and education and promotes inter-sectoral collaboration and communication.

Furthermore, the plan clearly defines stakeholder roles and responsibilities and secures sustainable funding and resource commitments, ensuring effective implementation and long-term impact in preventing and controlling zoonotic diseases.

Step 4: Implementation

The implementation phase brings the One Health approach to life, translating plans and protocols into tangible actions. This involves mobilizing resources, deploying personnel and establishing infrastructure to execute planned interventions. Coordination across sectors is crucial to ensure interventions are comprehensive, efficient and timely. By fostering collaborative effort, effective resource management and adaptive response to emerging challenges, implementation efforts can achieve lasting impact in preventing and controlling zoonotic diseases.

Step 5: Monitoring and evaluation

Ongoing evaluation and improvement are critical components of the One Health approach, ensuring the sustained effectiveness of zoonotic disease programmes and the overall system. This step involves systematic evaluation of successes and identification of areas for improvement to address weaknesses in the response. By continually refining strategies and approaches, stakeholders can enhance their capacity to control zoonotic diseases and other health threats at the human-animal-environment interface.

This iterative process fosters adaptability, innovation and resilience, ultimately strengthening the response to emerging health threats. Furthermore, evaluation and improvement efforts facilitate knowledge sharing, inform evidence-based decision-making and optimize resource allocation.

Areas for integration of One Health

Effective implementation of the One Health approach requires integration across various technical domains within zoonotic disease programmes (Hitziger et al 2018).This comprehensive strategy fosters collaboration and coordination among human, animal and environmental health sectors, ensuring a unified response to zoonotic diseases.

Laboratory services: Combining environmental, animal and human laboratory testing improves diagnostic ability, makes data sharing easier and encourages collaborative research projects.

Surveillance and joint epidemic investigation: Coordinated surveillance and investigation facilitate prompt zoonotic disease epidemic detection, tracking and response.

Prevention and control: Coordinated preventive and control strategies, like vector management and immunization, lower the risk of disease transmission and safeguard the general public health.

Preparedness: Developing joint emergency response plans and conducting simulation exercises ensures readiness for potential outbreaks.

Communication: Stakeholders are engaged, public awareness is raised and information sharing between sectors is facilitated by effective communication tactics.

Workforce development: Professionals involved in the prevention and management of zoonotic diseases benefit from multi-disciplinary training and capacity-building initiatives that improve their skills and knowledge.

Government and policy: By ensuring that laws and regulations are in line with integrated approaches, coordination between government agencies, legislators and stakeholders promotes a climate that is conducive to the implementation of One Health.

Multi-sectoral collaboration and inter-disciplinary partnerships are required to mitigate the impact of endemic and emerging zoonotic diseases of public health importance. Collaborations across sectors relevant to zoonotic diseases, particularly among human and animal (domestic and wildlife) health disciplines, are essential for quantifying the burden of zoonotic diseases, detecting and responding to endemic and emerging zoonotic pathogens, prioritizing the diseases of greatest public health concern and effectively launching appropriate prevention, detection and response strategies. Multi-sectoral approaches under a One Health umbrella are more expedient and effective and lead to efficient utilization of limited resources (Heymann and Dar 2014, Anon 2012).

CONCLUSION

For zoonotic disease prevention to be effective, a complete One Health framework is essential. Strong animal health surveillance, tracking of worldwide outbreaks, inter-disciplinary cooperation and increased awareness among stakeholders, mainly farmers, livestock management and environmentalists, are all necessary for this integrated strategy. The GOHF is an essential tool for tracking progress, providing access to resources and encouraging the adoption of international best practices. Adopting the One Health paradigm enables nations to move from prioritizing specific diseases to developing all-encompassing systems that counter various health risks at the interface of humans, animals and environment. GOHF promotes a cohesive, strong and flexible reaction to protect the health of people, animals and the environment. This framework facilitates the development of systemic capacity and collaborative knowledge to enable comprehensive disease prevention and management. This leads to the optimization of disease control techniques and the preservation of inter-connected health. Countries can guarantee a healthier future for everybody by putting the GOHF into practice. This future will be marked by strong surveillance, inter-disciplinary collaboration, improved awareness, technology-driven advancements and higher vaccination rates

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