ONE HEALTH APPROACH TO ADDRESS ZOONOTIC INFECTIONS

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ABSTRACT

Zoonotic diseases are infectious diseases which are shared naturally between man and vertebrate animals. As per ILRI, three quarter of emerging human infections are zoonotic. As these diseases occur from animal human interface, this highlights the need to shift to a more proactive, integrated and collaborative approach such as One Health. One Health is a multisectoral transdisciplinary and collaborative approach to optimise human animal and ecosystem health by keeping them in the single domain. One Health demands the collaborative efforts from all stakeholders in line to build a safer planet for all.

KEYWORDS: zoonotic infections, wild reservoirs, One Health, collaboration, safer planet

INTRODUCTION

World Zoonosis day is a global day to raise awareness and action on prevention and control of Zoonotic diseases. It is celebrated every year on 6th July to commemorate the scientific achievement of Louis Pasteur who successfully administered the first vaccine against Rabies in 1885. Since then, this day is observed as 'World Zoonosis Day' all over the globe.

ZOONOTIC INFECTIONS

Zoonotic diseases are infectious diseases that can be spread from animals to human being and vice versa. It spreads via direct contact or can be vector borne or food borne. As per International Livestock Research Institute, three quarter of emerging human infections are zoonotic. 60 percent of these are transmitted by animals and 70 percent have animal origin(Jones et al., 2008). According to a report of UNEP, two million people in low and middle income countries die each year from neglected endemic zoonotic diseases.

Covid-19 virus that has left a dramatic impact on the human heath, society and economy is surmised to have link with bats and hence considered as a zoonotic disease. This is not the first of the kind where the occurrence of a human infection can be traced backed to have an animal origin. Earlier in 2003, China was smacked by an epidemic caused by another strain of SARS COV that is believed to be an animal virus of unknown reservoir. In the recent past it was observed that multitude of human infections have an animal link. The 2009 Influenza H1N1 pandemic, SARS COV1, Middle East Respiratory Syndrome (MERS) CoV, NIPAH virus outbreak in Kerala, monkey pox outbreak in endemic and non endemic countries are some examples of zoonotic infections that have wrecked havoc in the mind of people.

FACTORS CONTRIBUTING TO THE OCCURRENCE OF ZOONOTIC INFECTIONS

As per a report published by UNEP, the factors that have exacerbated the risk of zoonotic infections are ever increasing human population and its unchecked activities, growing demand for animal protein (in the last five decades, meat production has increased

by 260%), unsustainable agricultural intensification, destruction of nature habitat and wild spaces, extensive utilisation, poaching and exploitation of wildlife, unsustainable utilisation of natural resources due to rapid urbanisation, change in the land use pattern and industrialisation, swift international trade and travel that have erased borders and distances, alteration in the food supply chain and climate change and biodiversity loss.

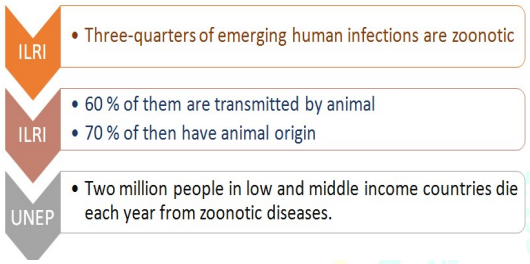

Fig 1: Statistical evidences

The unchecked use of antimicrobials in food animals is another factor responsible for emerging zoonotic infections. Its increases the potential for development of drug resistant strain of zoonotic pathogens which may jump from animal to human population. Such antimicrobial resistant strains are a matter of concern as it makes the easily available antimicrobials ineffective against the zoonotic diseases (UNEP, 2020).

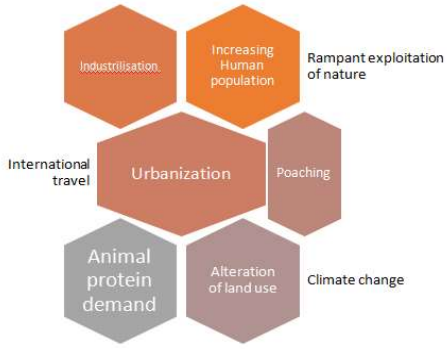

Fig 2: Factors contributing to the occurrence of zoonotic infections

CONTROLLING ZOONOTIC INFECTIONS

Looking into the economic and public heath burden of the ongoing pandemic and its devastating impacts, we need to be more proactive to stop another pandemic from happening. With an eye to curb the transmission of zoonotic diseases, we must raise awareness and increase knowledge on zoonotic and emerging pathogens, threats they possess to human health and measures to tackle the risk of future outbreak at all levels. This requires a line of scientific enquiry into the complex social, economic and ecological dimensions of emerging zoonotic diseases. We should pinpoint the core drivers of the emerging zoonotic diseases from animal husbandry settings (both in industrialised agriculture and small production) to conversion of land and climate change. These factors are crushing natural habitat, causing large scale ecological imbalance thus pushing people closer to the disease vectors. We should upgrade the sanitary measures and develop effective means to monitor and regulate the traditional food markets and incentivise the legal wildlife trade and animal husbandry to take up measures to combat zoonotic infections. The drivers of zoonotic diseases generally coincide with the drivers of the climate change and biodiversity loss. Animal extinction due to exploitation, deforestation and poaching is another cause of zoonotic spill over. In order words, the health of mankind hinge on the health of the planet Earth and other species. Hence, we should build a healthy, green and safer planet.

ONE HEALTH

Certain viruses have the tendency for genetic mutation that may produce a new genotype and a new pandemic. An article in the Indian Journal of Medical Research says nearly 7,00,000 animal viruses may causes human infection. Wild animals are regarded as veiled threats for many global pandemics. Many domesticated animals may act as the amplifier host of pathogens emerging from the wild. This indicates that most of emerging human infection arises from wild animal reservoir in bio diverse landscape that has been metamorphosed owing to potent anthropogenic pressure and other associated ecological and climate change. These factors

have contributed in shifting the geographical range of species and pathogen which has led to the emergence of novel health threat. And this underscores the urgency for all the stake holders in line to switch to more holistic, proactive and integrated paradigm such as 'One Health'. One Health is a collaborative, multi-sectoral and trans-disciplinary approach to optimise human, animal and ecosystem health by keeping them in the same umbrella. This concept was advocated by World Health Organisation (WHO), Food and Agricultural Organisation (FAO), World Organisation for Animal Health (OIE) to fight human infections by human-animal- environment interface. One health initiative forms part of Sustainable development goal, International Health guidelines, the global Health Security Agenda, UN Paris agreement on Climate Change, UN political declaration on Antimicrobial Resistance.

Fig 3: One Health Initiative

One Health approaches requires multi sectored, multidisciplinary and multi speciality coordination. Appropriate research should be carried out both at animal and human levels and their results should be integrated. Its success depends on institutional collaboration, joint planning etc. Strong surveillance should be implemented with a view to curb such brutal viral outbreaks at its commencement. Centre for Disease Control and Prevention (CDC) is holding international events on 'zoonotic diseases' to help countries to prepare action plan for these diseases containment. An innovative 10 years partnership Global Virome Project (GVP) has put tremendous efforts to detect the unknown viral menace. International Health Regulations (IHR2005) that was adopted in 2005 aims to provide public health responses to prevent and control international spread of diseases. WHO is collaborating with all international organisations dealing with animal health to bolster the contribution of veterinarians in the enforcement of IHR (2005) and monitoring zoonotic diseases.

WHY ONE HEALTH?

One Health helps us to promote science based decision making. It minimises unnecessary duplication among the sector responsible for the health of human, animals and environment. It helps us to address outside determinants influencing disease burden more effectively. It emphasises on early detection and response to potential zoonotic threats at their sources ideally before they emerge in the human population. One Health initiative aims to improves animal, human and ecosystem health globally. It helps us to meet new global challenges through collaborations. It develops centres of excellence for education and training by collaborating professionals from human medicine, veterinary medicine, environmental experts and other areas to achieve the best health out come for people animal and ecosystem

Fig 4: Benefits of One Health

ONE HEALTH STATUS IN INDIA

Although in India, One health initiative is in nascent stage, it is strategically gaining popularity due to escalating cases of emerging zoonotic infections. OH model needs collaboration and integration among

several sectors related with agriculture, animal health, and human health (FAO., 2010). In India, multitudes of cross cutting policies as well as regulatory measures are operating to bolster the development of this initiative in the nation. In the year 2007, National Standing Committee on Zoonoses was formed to address Zoonotic infections in the country. Food safety and Standard Act was enacted in the year 2006 to deals with concetns like food safety, food borne illness, antimicrobial resistance toxic residues, environmental contaminants etc (FSSA., 2006). Several initiatives have been taken by government to control infections like Brucellosis, Rabies, and Tuberculosis etc. In India, the Centre of Zoonosis, National Centre for Disease Control, India use to publish a manual for efficient and proper handling of deadly zoonotic infections. Various trade policies have been implemented by the Indian government to adhere with stringent quality measures of international standards. India is in a process of developing appropriate organisational structure to built One Health hub for amalgamation of interdisciplinary activities to address issues occurring at human-animal interface (*Chatterjee et al., 2017)*.

One health contributes towards more efficient and effective response to emerging and endemic zoonotic infections. It focuses on the urgencies of strengthening zoonotic pathogen surveillance systems and bolstering the laboratory capacities to identifying hotspots for zoonotic infections and to curb such brutal infection at its commencement. Controlling zoonotic transmission is a tedious job and requires the collaboration of all stakeholders in line to act in consortium for addressing the issues.

WAY FORWARD

Health of the animals should be monitored properly. Emerging zoonotic infections should be tracked at its commencement to impede the pace of its transmission. All the stakeholders in the line should join hands to improve animal disease surveillance and monitoring. Awareness should be raised amongst all farmers, livestock managers and environmental specialist regarding one health initiative and zoonotic infections. A national database of zoonotic diseases needs to be developed. Mass vaccination should be conducted in endemic areas. Multisectoral coordinated platforms need to be developed with sustainable approaches to One Health.

CONCLUSION

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