

Popular Article

World Zoonosis- a lesson to consider “One Health”

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Abstract

In Recent time's Zoonotic diseases are emerging and reemerging at a speed beyond our imagination and capacity to control. The traditional approach of focusing only on human health in these contemporary times does not seem to be the solution for eradicating these deadly diseases. Our approach should be directed towards striving for one health. Causative agents, natural hosts, and the environment are the three key components to controlling and preventing any zoonotic diseases. Besides taking appropriate measures before these diseases could establish in unnatural hosts like humans, we need to work on the factors that are conditioning them to become more and more virulent. It is the critical time that one has to reflect upon and be vigilant on environmentally sensitive actions with the underlying principle of “One Health” a concept of new health.

Introduction

According to WHO, A Zoonotic disease is a natural infection transmitted to humans from any vertebrate host. The word Zoonosis stems from a Greek origin given by Rudolf Virchow. Zoo –animals, noses- diseases. July, 6 remains to be one of the most memorable days in human history. It is on this day French biologist Louis Pasteur, successfully administered the first-ever vaccine to a patient, Joseph Meister against the deadly disease Rabies. Annually this day is widely celebrated as “World zoonosis day” to raise awareness regarding the zoonotic disease and to come up with better solutions to combat them. To this day more than 250 diseases are found to be zoonotic; the count seems to be unstoppable and expanding with the availability of better serological techniques for identifying new pathogens in humans and their vertebrate hosts and an increase in the wide variety of new pathogens. In the light of rapid ecological changes occurring globally. More than 60% of present-day diseases affecting humans are traced to emerging and transmitting from animal hosts.

Why Are They Emerging:

Zoonotic diseases that are emerging are either caused by an entirely unknown etiological agent or the organisms known previously however in entirely new species never known to infect previously.

- The potentiating factors could be changes in microbial characteristics of the etiological agent as a result of a rapid natural mutation. As a result, the causative agent undergoes changes at the genomic level that enhance its pathogenic intensity (avian influenza) or ability to acquire multidrug resistance (TB).
- Modifications of the immunological status of the population making them susceptible to the disease unknown previously.
- Lack of awareness about mechanisms of disease transmission and hygienic measures to prevent their occurrence.
- Changes in the lifestyle and habitation of humans are major enhancing factors of emerging diseases. The outbreak of brucellosis. As a result of urbanization in countries like Peru, Israel, Palestine, etc.
- To meet the needs of the growing population intensive farming with new animal species lead to the emergence of virulent agents (swine flu).
- Food processing Industries paved a new ecological niche for pathogens to emerge in a different outlook and opportunities for survival of etiological agents. Food-borne diseases such as E-coli 0157:H7, Salmonella, Listeria, and Campylobacter species.
- Ecological modifications in the natural equilibrium or natural echo-niche result in the origin of several unknown diseases with high fatality rates. Extensive deforestation leads to the emergence of kysanur forest disease.

Impact Of Zoonosis

The impact of zoonosis should not be measured merely in terms of monetary values. The damaging effects are manifold. Clinical effects in terms of illness, morbidity, and mortality depend on the intensity of the etiological agent (Table -1). Huge costs are involved in vaccine production, control measures, and awareness campaigns. Economic repercussions as a result of pandemics due to interruption in mobility, trade, and transportation. Deprivation of health and productivity of animals is an ecological loss and indirect damage to the wellness of humans. Lowering immunity and post-infection complications in a large number of people also adds to the losses incurred. Many times, control measures like mass destruction of the reservoir species lead to a conflict that impacts biodiversity conservation.

People involved in activities closely attached to animals and the environment come under the high-

risk category. A higher risk of zoonotic exposure is observed in people in rural and remote areas. People working in slaughterhouses, animal health departments, and veterinarians are the first-line risk category groups.

Way Forward

Our approaches to these challenges should be refined and worked towards interdisciplinary actions. One such concept that is again in the news on a large scale is “ONE HEALTH CONCEPT” proposed by RUDOLF VIRCHOW way back in the 1800s. CALVIN SCHWABE a veterinarian trained in public health unified human and veterinary disciplines to combat zoonotic diseases by laying modern foundations for one health.

WHO a human wing and apex body of global health monitoring, along with the food and agricultural organization (FAO) an environmental wing, and the world organization for animal health (OIE) an animal health wing is now together leading ONE HEALTH CONCEPT to diverse sectors of society? The prime intention is Intersectoral collaboration and Interdisciplinary research for effective policymaking and program implementation.

Prevention And Control

The old saying “Prevention is better than cure” applies aptly to combat challenges in an environmentally friendly way. Environmental sensitive actions should be encouraged. The actions involving vaccination, chemoprophylaxis, and vector/reservoir control (breakage of transmission cycle) should be taken cautiously weighing the benefits and potential hazards.

Age-old practices such as hygienic maintenance, quarantine, and isolation are the foremost precautionary and effective measures to be incorporated in every way possible.

Strengthening of our health system to diagnose the disease early to prevent massive outbreaks of diseases. It should become the social and environmental responsibility of every citizen to become sensitive and tolerant of the effect on the environment and fellow creatures. It is the responsibility of public institutions to inculcate awareness in the people in the most practical way possible.

Utilization of technology and Modern strategies to enhance the efficiency of biosecurity measures for better animal health management. Overexploitation and indiscriminate research on the species must be terminated in the broader view to establishing sustainability in the environment and human existence. Apex body monitoring and intercommunicating the countries should be

strong enough to discourage any such activities that have potential effects on nature, animals, and the environment.

Conclusion

Every living being born has an equal right to undergo its way of living. The same applies to disease-causing agents. It should be kept in mind that these are turning to unnatural hosts like humans as a result of the unavailability of their natural hosts. It is entirely resultant of human intervention. These diseases are a part of the mechanism stabilizing the environment. Hence it is within our limitations to where we would like to take the human civilization. The destiny of the earth’s survival purely depends on the way of human civilization. Hence the basis of policy making should be along similar lines.

TABLE-1: Summarizing effect of Zoonotic diseases, their natural hosts, and preventive measures.

Diseases	Transmission	Symptoms	Prevention and Treatment
Anthrax	Effectuated raw meat, anthrax spores, vectors	Eschar, cough in pulmonary lesions, diarrhea, and vomitions.	BioThrax vaccine. Penicillin
TB	Infected meat ingestion, direct contact	Tubercle lesions in organs, weight loss, hemoptysis, night sweats	Bacille calmette Guerin vaccine. Vitamins.
Plague	Rodents’ reservoir host	Septicemia, pneumonic signs, hemorrhage	EV NIEG vaccine. Tetracycline’s, ampicillin.
Leptospirosis	Dog and Rodents reservoir host	Chills, headache, volitions, redness of the eye	Interrogans serovar Hardijo or serovar Pomona vaccines. Doxycycline.
Coronavirus	Bats, dogs, cattle, zoo animals	Fever, sore throat, cough, fatigue, hemoptysis	Covaxin, covishield vaccines.

			Oseltamivir, chloroquine, ribavirin.
Avian influenza	Chicken, goose, swine, waterfowl	Respiratory illness, fever, diarrhea, arthritis, dyspnea	Influenza A vaccine. Oseltamivir, zanamivir.
Toxoplasmosis	Rat, cat	Reproductive problems- stillbirth, eye infection, splenomegaly	No vaccine. Clindamycin.
Rabies	Laden saliva, via bite wounds, rarely licking	Hydrophobia, hyperexcitability, delirium	Imovax vaccine. No treatment.
Leishmaniasis	vector	The cutaneous form is curable, visceral form is fatal- fever, splenomegaly, liver, anemia	No vaccine. Pentecostal
Mucormycosis	immunosuppression	Dyspnea, fever, cough, headache	No vaccine Amphotericin- B
Ebola	Bat reservoir host, Monkey, antelope, gorilla	Fever, sore throat, vomiting, diarrhea, rashes, stomach pain, hemorrhage	ERVEBO vaccine Supportive therapy.
KFD	Tick bites, rats, bats, monkey	Chills, body ache, biphasic fever, hemorrhage	Formalin inactivated tissue culture vaccine. Supportive therapy.

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