

HEALTH IMPLICATIONS OF ZONOTIC DISEASES

Zoonoses are among the most frequent and dreaded risks to which mankind are exposed. Human beings have always contact with animals, relying on them for food, transport, draft-power, labour and companionship. Domestication of animals also brings along with it the opportunities for the passage of pathogens from animals to man and vice versa. However, countless species of animals are also sources of viral, bacterial and parasitic diseases transmitted in many ways, including direct contact from them or water contamination by them.

In addition, infections which poses challenges to human health and welfare, originate either from animals directly or through their products and by-products. Hence human health is inextricably linked to animal health and production. This link between human and animal population and the environment is particularly close in developing countries. In both developing and industrialized regions, however this can lead to a serious risk to the public health with severe economic consequences.

About 75% of the new diseases (emerging zoonosis) that have affected humans over the past 10 years have been caused by pathogens originating from animals. Many of these diseases has the potential to spread through various means over long distances and become global problems (e. g. HPAI).

Approximately 80% of all described human diseases are from animals. For many diseases only circumstantial evidences for natural transmission is there so known as "suspected zoonosis" and epidemiology of many diseases is not sufficiently understood hence are called "masked zoonosis".

Some humans are more at risk to zoonotic diseases than others e.g. infants and children (immature immune systems, poor hygiene) , pregnant women (immune systems are more susceptible and there are additional fetal hazards), elderly persons (immune systems may be impaired), immune-compromised people (undergoing cancer therapy, AIDS/HIV patients), people who have received organ or bone marrow transplant , people born with congenital immune deficiencies, veterinarians ,farm families and other animal health care workers.

All major zoonotic diseases prevent the efficient production of food of animal origin, particularly of much needed protein and create to international trade in animals and animal by products.

Socio-economic aspect of Zoonosis

Zoonosis has been a social and economic burden. For many years and in many countries these diseases, with their reservoirs in domestic and wild animals, have imposed and are still imposing a very heavy burden, especially among the vast number of people living and working in rural areas.

The significance of zoonotic and parasitic diseases and related food-borne diseases, is growing continuously and their health and socioeconomic impacts are increasingly being felt by many countries and most particularly, although not exclusively, by developing countries. Apart from causing human suffering, morbidity and mortality, they hamper agricultural production, decrease availability of food, inhibit the generation of capital needed for investment and create barriers to international trade.

The great changes of the last decades, especially the increasing urbanization, most of which is inadequately planned, large movements of populations, opening up of badly needed new areas for food production, the increasing trade in meat, milk and other products of animal origin, the vastly increasing number and speed of vehicles, and even tourism have contributed to making the problem of zoonoses not only rural and characteristic of defined areas but regional and, in some cases, worldwide.

The developing countries suffer much loss than technically developed countries. This is attributable to the lack of adequately organized public health and veterinary services, poor hygiene, poor facilities for prompt diagnosis, poor standard of living and poverty and to particular social customs prevailing in the predominantly agricultural societies of developing countries. Besides causing economic losses (related to treatment, immunization, loss of wages, loss of man- hours and man-power), morbidity and mortality in humans, zoonosis causes considerable loss of livestock, their productivity (dairy products, protein food, and animal by-

product industries) and reproductivity. Thus zoonosis acts as a double-edged weapon affecting social fabrics and economic development.

The socio-economic losses of zoonoses though, significant, are difficult to quantify completely because completely because as with other human disease the actual costs in terms of lives and suffering cannot be measured. In addition the losses in export and investment opportunities and the consequent losses in foreign exchange by countries because of zoonoses cannot be estimated.

There are many features of zoonoses that render them particularly important to the developing countries and especially the poor whether they are livestock owners, labourers working with animals, livestock owners consuming products from their animals or non-livestock owners consuming these products.

First of these features is that many of these diseases produce fatal and disability in humans, the prevention of which is often through their control in animals. This requires the availability of appropriate veterinary and animal health technologies and their delivery to and accessibility by the people. Human sleeping sickness caused by *Trypanosoma brucei rhodesiense* is an important example in which mass treatment of cattle significantly reduces the risk of disease in humans. Another example is human epilepsy in which neuro- cysticercosis caused by the intermediate host of the pork tapeworm (*Taenia solium*) is considered the main cause.

The second feature is that while there are some zoonoses to which a large section of any given human population is equally susceptible the poor and the developing countries are at particularly at risk to many of them. Example include cysticercosis in pig in which poor sanitation is the underlying cause for which the knowledge and resources to adopt preventive measures are limited or absent. Another example is Leptospirosis in which rats play an important role in the maintenance of infection and rats often thrive in poor and dirty environment.

The third and possibly the most important of these features is that the lower down the income scale, the more likely is the high risk of multiple zoonoses. Examples can be found in some rural and peri urban settlements where animals co exist with families struggling for survival. There is potential risk of human brucellosis and Tuberculosis from cow. The risk of multiple zoonoses is

a factor poor purchase of cheap animals that may be culls of others or meat that have not been inspected, lack of knowledge and resources to protect their dogs from rabies.

PUBLIC HEALTH SIGNIFICANCE OF RODENTS, BIRDS AND INSECTS, CONTROL MEASURES AND SURVEILLANCE

Rodents

Rodents constitute a great hazard for both man and animals

- (1) They eat/spoil farm grains
- (2) Rodents kill birds especially chicks
- (3) They damage building
- (4) They cause offensive odour through their urine
- (5) They spread diseases to man and his animals

Major diseases spread by rodents:

(1) Leptospirosis- *Ictero hemorrhagiae* (Weil disease): This is a primarily disease of dogs and rats. The disease is commonly transmitted to man by rat. Infection is commonly acquired by contact of skin or mucus membrane with urine, and to a lesser extent by intake of urine contaminated feed and water.

(2) Plague (Flea- Xeno)- This is a zoonotic disease involving rodents and their fleas which transfer the bacterial infection to various animal and to people. Plague is caused by *Yersinia pestis*. Wild rodents serve as natural reservoir of plague.

(3) Murine typhus fever/shop typhus/fleas borne typhus- This is a rickettsial disease caused by *Rickettsia typhi*. It is transmitted to man through infective rat fleas – *Zenopsylla cheopis* which defecate rickettsiae while sucking blood, contaminating the bite site and other fresh skin wound.

(4) Rat bite fever- This is primarily an infection of rat caused by *Streptobacillus moniliformis* and *Spirillum minus*. Infection is transmitted by secretions of mouth, nose or conjunctual sac of an infected rat introduced by biting. Direct contact with rat is not necessary. Children under one year of age are most frequently involved.

(5) Lassa fever- This is an acute viral illness caused by Lassa virus (arenavirus), Wild rodents, the multimammate mouse *Mastomys natalensis* serve as natural reservoir. Transmission is primarily through direct or indirect contact with excrete if infected rodents deposited on surface such as floors, beds or in food.

Survey of rat and mice

(1) Rodent survey is the inspection of a rat infested area in order to assess the extent and size of infestation breeding places, openings whereby the rat enter the building, the species concerned and thereby determine the method of control suitable for the premises.

Method of Survey

(1) Trap and Catch – To determine type of rat/mice involved

(2i) Droppings – Examination of rat droppings will reveal whether the infestation is an old one or of recent one

(ii) Families of rat involved

(3) Runaways and Tracks – These are their travel routes

(4) Gnawed materials- These can be observed on wood or lead pipe

(5) Presence of holes, scrapper, nests, rat odour

Essential tips for rat control

(a) Establishment of rat control unit in large cities, rural areas and big companies

(b) Shelters for rats should be eliminated and garbage and waste which serve as food for rat should be disposed of hygienically

(c) All buildings should be rat proof

(d) Rat should be destroyed using poisoned baits and traps and fumigation of burrows done with the use of poisonous gases

Control Methods

(1) Sanitation- Appropriate storage and disposal of food, garbage and refuse is necessary to prevent access of peri-domestic rodents to food and shelter

(2) Physical methods

Rat proofing construction

(a) Concrete foundation to prevent rat burrowing

(b) Doors should be of metal/glass or good treated wood

(c) Openings around pipes passing through the wall should be sealed

(d) Wire mesh should be installed around window

(e) Install metal grids or gutters

3. Trapping- This is of limited use because rats are very prolific

Snap trap or brake-back trap can be used

4. Biological control- This involves elimination of pests by their natural enemies

- Introduction of cats and dogs into rat infested premise can control them to a certain level

Chemical control of rodents.

1. Synthetic inorganic-

Zinc phosphide

Arsenic pentomide

Thallium sulphate

Barium carbonate

2. Anticoagulant rodenticides

Warferin and Congeners

Fumain, Fumasol and Tomorin

3. ANTU (Alpha Naphthylthiourea)

4. Bromethalin

5. Cholecalciferol

6. Phosphorus

7. Red squill (Cardiacglycoside)

8. Sodium Fluoroacetate (1080)

Sodium Fluoroacetamide (1081)

9. Zinc phosphide (Al phosphide)

Fumigants- Organic (Hydrogen cyanide)

Rat glue- Inorganic- Sulphur dioxide

Carbon monoxide

Glue is made up of resin and oil and underlying tissues by penetrating through the skin of animals and man.