



Zoonotic Diseases and its Importance in Human Health

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Sharing knowledge and understanding its importance is a great gift to humans. One of the important tools with us is connectivity and that to worldwide. This make it easy to spread the knowledge about science, politics, economics, environment and utmost importance for everyone i.e. health. October has been dedicated worldwide for creating awareness about health. Many important days concerning health awareness are celebrated worldwide in October like World cerebral palsy day (Oct. 06), world mental health day and National depression screening day (Oct., 10), Metastatic breast cancer awareness day (Oct. 13), pregnancy and infant loss awareness day (Oct. 15), National latino AIDS awareness day (Oct. 15), world food day (Oct. 16), world pediatric bone and joint day (Oct. 19). Most weeks of this month are also dedicated for creating awareness about different health topics such as Mental illness awareness week (Oct. 6-12), Bone and joint health national action week (Oct. 12-20), international infection prevention week (Oct. 13-19), Respiratory care week (Oct. 20-26), National health education week (Oct. 21-25), National Health care quality week (Oct. 20-26). Major and serious health care issues have been covered in these special days and weeks but what about the minor ones and which may also be fatal. A lot of diseases are there which spreads between vertebrate animals and humans known as zoonotic diseases. Thus animals play a crucial role in maintaining zoonoses in nature. Zoonoses can be of bacterial, viral or parasitic origin. These diseases put human life at risk and also severely affect the production of food of animal origin. World zoonoses day is celebrated on 06 July every year. At least 61% of all human pathogens are zoonotic, and have represented 75% of all emerging pathogens during the past decade. Except for the newly emerging zoonoses such as SARS and highly pathogenic avian influenza H5N1, a vast majority of zoonotic diseases are not prioritized by health systems at na-

tional and international levels and are therefore labelled as neglected. Some important among them will be discussed in this article.

Anthrax

It is a bacterial disease caused by gram positive spore forming bacterium *Bacillus anthracis* affecting all warm blooded animals. Humans usually acquire infection through direct or indirect contact with infected animals or through occupational exposure to contaminated animal products. The disease is prevalent in developing countries. In humans the disease have three forms. Inhalation anthrax is an occupational disease reported only in industrialized countries and acquired by breathing in spores; gastro-intestinal anthrax is acquired from eating infected meat from an animal that died of the disease and the cutaneous form, which accounts for more than 95% of reported cases in developing countries, is acquired through skin lesions. Case fatality of cutaneous anthrax is reported to be < 1% if treated appropriately [1] but in lack of treatment about 20% of the affected persons can lead to fatal sepsis [2]. Human anthrax have been virtually eliminated because of effective human and animal vaccination, veterinary supervision of animal slaughter and quality control of animal products [3]. It remains as occupational hazard of herdsman and animal workers in certain parts of world [4].

Bovine tuberculosis

It is caused by *Mycobacterium bovis* and zoonotically affect humans most of the times extra-pulmonary. In humans *Mycobacterium tuberculosis* is the causative agent in vast majority of cases. *Mycobacterium bovis* infect humans through inhalation and ingestion and via contact through mucous membrane and skin wounds. The route of infection decides the clinical manifestation of the disease eg. Oral infections acquired by drinking unpasteurised milk from affected cattle results in cervical or mesenteric lymph node affections, aerogenous infections leads to pulmonary form which is

indistinguishable clinically, radiographically and pathologically [5]. The cycle of infection is maintained by transmission from animal to human, human to human and also human to animal. Immunocompromised individuals are more prone to infection [6].

Rabies

It is an infectious viral disease (Lyssavirus genus of Rhabdoviridae family) which is fatal once the symptoms appeared. It can affect all warm blooded animals. Most common cause of its transmission is through bite of dogs or contact of exposed mucosa to the virus laden saliva. After reaching the brain the virus replicate again and manifest two forms based on clinical signs i.e. furious and dumb form. Furious rabies is the most common form in humans accounting about 80 percent of cases. Rabies is endemic all over the world except antarctica. Rabies alone account for death of 59000 humans annually worldwide with 95% of cases occurring only in Africa and Asia. India accounts 59.9% cases in Asia and 35% in world. World health organization aimed to eliminate rabies by 2030 and we all should cooperate to achieve this target. An integrated investment strategy and intersectoral approach is needed to make this vision a reality. Implementation of this strategy would combine the expertise of FAO, OIE and WHO as well as other major stakeholders including the Global Alliance for Rabies Control (GARC), with the aim of gaining support from countries and funding agencies worldwide to act through existing international health mechanisms [7].

Cysticercosis and neurocysticercosis

Cysticercosis is caused by ingestion of raw pork contaminated with cysticerci, the larval form of tapeworm *Taenia solium*. The adult worms developed in intestine up to three meter length will shed eggs in human faeces which than complete the cycle by infecting the same or other human or swine. The eggs develop to larval forms and migrate in different tissues of body rendering the pork a source of infection. Pigs get direct or indirect infection which is related to the unhygienic rearing of the animals. It is a serious public health issue in many poorer countries of Asia, Africa and latin America. The estimated population affected from cysticercosis worldwide is 50 million and in endemic areas causes some 50000 deaths annually.

Influenza/flu

It is a highly infectious and pandemic viral disease affecting a huge number of animals as well as human populations. Influenza is the reason for one of the largest public health crisis in the world i.e. 1918 Spanish flu affecting one third of the world population. Influenza viruses affect a wide variety of mammalian and avian species.

Animal influenza viruses are distinct from human seasonal influenza viruses and do not transmit easily. But the zoonotic viruses can infect humans by direct or indirect contacts and can cause disease ranging from mild illness to death. Influenza is a matter of global concern not only because it affect animals but more because of the public health significance of the affected animals. In 1976, for the first time the swine fever virus (H1N1) was recovered from the sick workers of swine farm in wisconsin.

Birds are the natural host of avian influenza viruses. After an outbreak of avian influenza virus (H5N1) in Hong Kong in 1997 it is spreading worldwide from Asia to Africa and to Europe. These viruses change their subtypes very rapidly. The latest update was from china for a case infected with avian influenza A virus (H5N6). On 11 March 2019 world health organization launched global influenza strategy 2019-2030. The strategy aimed to prevent seasonal influenza, control transmission of influenza from animals to humans and to prepare for the next influenza pandemic. All human infections caused by a new subtype of influenza virus are notifiable under the International Health Regulations [8].

Brucellosis

It is a globally spread bacterial disease transmitted directly through aborted foetus or placenta and indirectly through consumption of unpasteurised milk products. Fresh milk and dairy products prepared from unpasteurized milk such as soft cheeses, yoghurts and ice creams may contain high amounts of the bacteria and consumption of these is an important cause of human brucellosis [9]. This bacterial disease causes severe debilities, fever, sweating, fatigue, weight loss, headache and joint pain persisting for weeks to months. It can also lead to neurological complication, endocarditis, testicular and joint abscess [10]. Most symptoms of brucellosis in humans can be confused with typhoid, rheumatic, spinal tuberculosis, pyelitis, cholecystitis, thrombophlebitis, auto immune diseases and tumors [11,12]. In a review of 76 diseases, brucellosis lies within the top ten in terms of impact on impoverished people. In 2009, the Foodborne Disease Burden Epidemiology Reference Group (FERG) of the World Health Organization (WHO) commissioned a series of systematic reviews on the burden of neglected zoonotic diseases, with the aim of incorporating the findings into the overall global burden of disease assessments [13]. No vaccine is available for human brucellosis but for bovine and ovine/caprine brucellosis the *B. abortus* (S19 strain) and *B. melitensis* (strain Rev 1) respectively are proven to be very useful under most conditions [14-18]. Reporting of human brucellosis is

very important to check the spread of this disease. Care should be taken by the animal handlers and veterinarians not to come in contact with affected animals and aborted fetuses in last trimester.

Conclusion

Poorer sectors of the society are liable to be affected more from zoonotic diseases as they are rearing animals for their livelihood. They are also either uneducated or lack knowledge about these conditions. It is our (veterinarians) duty to aware such people about these diseases as we are working at field level and contacting them frequently. Let us make this month of health awareness more meaningful by spreading knowledge about zoonotic diseases.

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