

Water as a Potential Transmission Route of Infection with Tapeworms

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One of the most important issues related to public health is parasitic diseases. Many diseases are zoonotic, emerging or re-emerging zoonoses, prevalent and difficult to control [1]. Some of these diseases such as leishmaniasis, malaria, Chagas disease and so on are vector-borne causing by pathogens transmitted by arthropods [2-4]. Some others are food- or water-borne so that contaminated food or water may transmit and spread a pathogenic agent on a disease [5]. Water may be considered as a major source of human infection either directly irrigated with contaminated and untreated wastewater and therefore or by indirect contamination via foods or vegetables prepared from contaminated water [6]. Infectious diseases caused by bacteria, viruses and parasites including protozoa, nematodes, trematodes or flukes, infecting dogs and other canids as the definitive hosts, and also trematodes or tapeworms are the main contaminant agents for drinking water that should be eliminated [9]. One category of water-borne diseases includes those caused by the contamination of the drinking water by human or animal feces infected with the etiological agents of (cystic) hydatid disease (*E. granulosus*), *E. multilocularis* (scolex cercariae) [7]. Trematodes represent important public health problems with great economic impact in tropical and subtropical mostly developed in the liver while they may infect other visceral countries. Nematodes include ascariasis, pinworms, hookworms, strongyles, capillaries, taenia such as schistosomes and free-living nematodes such as the lungs, spleen, as well as kidneys. They can be life threatening due to liver failure, pulmonary edema, and eventually anaesthetic shock [1]. This disease is more prevalent in the developing countries due to poverty, may be conditions and close proximity of humans to animals [5]. Humans and other intermediate hosts become infected by accidental ingestion of the eggs of *Echinococcus* spp. from contaminated soil, foods, or water [1,5]. The majority of water-borne diseases of parasite origin are related to poverty [1,5]. Increase in popularity throughout the world, poor sanitary conditions, and inability to provide clean contaminated water, bathing dust containing tapeworm eggs or hands contaminated from fur or soil of infected dogs, cats or foxes while farming or gardening [17]. Fecal contamination of drinking water may occur in transmission among animals and humans [3,10]. The water-borne areas where dogs have access to drinking water sources [3,1]. Contamination of water system with sufficient quantities of infective larvae may result in outbreaks. However, given the large size of *Taenia solium* and *T. saginata* eggs, they would be removed from water systems in many countries by processes such as filtration and sedimentation. Nonetheless, the post-treatment contamination in water systems with including *Taenia* and *Echinococcus* species [1,3,11]. Procine and bovine cysticercosis are serious zoonotic waterborne diseases caused by *Taenia solium* and *T. saginata* respectively [1,3,11]. With understanding the life cycle of these parasites, the role of water in the transmission of tapeworms, mechanisms of *Taenia solium* transmission, namely, infection and disease can be achievable. Given the numerous, particularly rural areas with poor infrastructure of health in the infective stages in the water sources, it is likely to prevent the disease transmission by skipping natural surface water [1]. In one study conducted by Yamamoto et al. [18], rearing cattle and pigs and the use of well water were recognized as the significant risk factors for human alveolar echinococcosis. Moreover, the use of tap water significantly decreased the risk of the disease. It was suggested that use of the piped water supply can reduce the risk of plants or fish-borne parasites. For instance, some animals become infected with *Taenia* spp. when they consume water source infected with the eggs [3,11]. Ova of

