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ISSN: 2329-891X
Journal of Tropical Diseases & Public Health

Perspective

Factors Responsible For the Endemicity of Intestinal Helminths

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DESCRIPTION

Helminth infections caused by Soil-Transmitted Helminths (STHs) and schistosomes are among the most prevalent afflictions of humans who live in areas of poverty in the developing world. The morbidity caused by STHs and schistosomes is most commonly associated with infections of heavy intensity. Approximately 300 million people with heavy helminth infections suffer from severe morbidity those results in more than 150,000 deaths annually.

Transmission

Intestinal parasitic infections are acquired by direct contact, faeco-oral routes, soil-transmission, food-animal transmission, auto-infection and by a common vehicle. Intestinal parasites are acquired mostly in contact and sometimes through common vehicle of spread.

Contact may be direct contact, i.e. the source and the host come in physical contact allowing for direct transfer of the agent or its indirect transfer through water, food, flies etc.

Faeco-oral route or person-to-person infection is important in cases of Helminth infections . Here, a short survival in the external environment without any incubation period in the soil is enough for transmission. These are essentially the infections of poverty and found throughout the world where there is inadequate hygiene and sanitation. Their control depends on the improvement of these areas that invariably accompany economic development.

Soil-transmission, i.e. an incubation period is required by the infective agents for their development to the infective stage in the soil under appropriate conditions of temperature and humidity. This is important in cases of Hook-worm and Roundworms. They are found in those areas of the world with poor sanitation where suitable conditions of soil, temperature and humidity prevail. They spread contamination of soil by eggs.

Food-animal transmission is relevant in cases of *Taenia* sp. Here developmental changes of the infective agents are required in intermediate host animals, which are important item of food for man, before they are capable of infecting human host.

- Auto infection occurs in and infections. The host is reinfected by the infective agent before it is excreted out in the external environment.
- Single inanimate vehicle may serve to passively transmit the infectious agent to multiple hosts.

Environment

Infectivity of most of the intestinal parasites in a particular area will depend on the development and survival of the infective agent in the external environment in the face of many hazards such as predators, unsuitable temperature, desiccation, flooding, frost, chemical substance, unsuitable soil, removal of shade, direct exposure to sunlight and ingestion by hosts other than natural hosts.

Temperature: The greatest mortality of eggs has been reported in soil at 40°C or above. Higher prevalence rates of roundworm infection show that low temperature is not detrimental to the transmission of this infection. The optimum temperature for development of eggs has been reported to be about 30°C. They cannot survive at 40°C or above.

Humidity: Ancylostomiasis is a disease of hot humid climate. The ova and larvae cannot withstand desiccation. The embryonated eggs of are reported to survive and remain infective in the dust for 4½ hours only.

Rainfall: Heavy rainfall evenly distributed throughout the year helps the soil to retain moisture and hence is a favorable factor for the transmission of intestinal nematodes. At the same time, torrential rain causing flooding of the area is detrimental to the development and survival of hookworm larvae.

Soil

An inverse relationship exists between prevalence of hook-worm infection and denseness of soil. Prevalence of hook-worm is

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Received: 24-May-2022, Manuscript No. JTD-22-17344; **Editor assigned:** 27-May-2022, PreQC No. JTD-22-17344 (PQ); **Reviewed:** 10-Jun-2022, QC No. JTD-22-17344; **Revised:** 17-Jun-2022, Manuscript No. JTD-22-17344 (R); **Published:** 27-Jun-2022, DOI:10.35241/2329-891X.22.10.333.

Citation: Xiaoge D (2022) Factors Responsible For the Endemicity of Intestinal Helminths. J Trop Dis. 10:333.

reported to be low in clay soil. Sandy soil is considered suitable for hookworm larvae WHO, probably because of negative rheotaxis, as is borne out by the prevalence rate of *Ascaris* and hook worm infections. Hook-worm larvae migrate better in cultivated soil than in uncultivated soil. *Ascaris* and *Trichuris* eggs do not survive as well as in sandy soil as in clay soil.

Food

Food can be contaminated with ova/cyst of *Ascaris, Trichuris* and *E. histolytica*, G. *lamblia* by houseflies, cockroaches, dust and fingers of food handlers.

Raw vegetables

Consumption of raw vegetables from the fields where faeces have been used as fertilizer or sewage for irrigation has caused *A. lumbricoides* and *E. histolytica* infections.

Drinking water

Sewage contaminated water supplies have been the major identified source of infection when safe chlorinated water supplies become contaminated because defects in sanitation and plumbing result in leakage or in sewage being siphoned back into the water lines, this probably aids in the spread of intestinal parasitic infections.

Incidence/prevalence of soil-transmitted helminths

The incidence of human intestinal helminthic infestation is widely recognised to be quite general in tropical as well as in temperate countries the intensity of infestation varies considerably in different population groups and form different localities. Helminthic intestinal 10 infection being a major public health problem in many developing countries like Africa, Saudi Arabia, Asia and South America, where as developed countries like the United States, Japan show very low incidence.