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Editorial Open Access

The Hidden Scene behind the High Prevalence of Giardiasis and Other Infectious Diseases in Certain Developing Countries

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Editorial

Giardiasis is the most common waterborne parasitic infection of the human intestine worldwide. The etiological agent, *Giardia duodenalis* (syn. *G. intestinalis*, *G. lamblia*), is a flagellated, binucleated protozoan parasite which infects a wide range of mammalians [1]. Approximately 280 million people worldwide suffering from symptomatic Giardia infection every year [2]. Giardia is a major cause of acute and chronic diarrhea with a prevalence range from 2% to 5% in developed countries [3] and from 10% to 50% in developing countries [4].

A WHO report revealed that poor water quality continues to create a major threat to human health whereas diarrhoeal disease is responsible for the deaths of 1.8 million people every year. It was estimated that 88% of that burden is attributable to unsafe water supply, sanitation and hygiene and is mostly intensified on children in developing countries [5].

Ingestion of contaminated food or water with Giardia cysts is the most common mode of transmission. Fecal-oral route through hands or fomites is another source of infection. However, Giardia could also be transmitted by oral-anal sexual contact [6]. The preliminary diagnosis of giardiasis is to large extent depend on meticulous history of the illness. Other helpful diagnostic tool is the knowledge about endemic areas with giardiasis where it is more common in developing countries with unhygienic water supply. The most significant issue about municipal water supply in some countries is leakage in pipes with low water pressure or flow rate. The sewage waste water pipes and municipal water supplies pipes are usually designed to be run nearly side by side because of the limited space in the sidewalk where the pipes are usually installed. Predominantly there is no continuous positive pressure within the municipal water supplies pipes because of interrupted or weak water flow. In case of water interruption, negative pressure within municipal water pipes is inevitable as a result of huge number of electrical water pumps activity. These pumps are used by most households during water flow slowness or interruption. On the contrary, the sewage waste water pipes are almost always overloaded as a result of blockage or overproduction. This will lead to entrance of sewage into municipal water pipes from which people use water for drinking, vegetables or fruits washing, dishes washing, and cooking. This might be the main source of giardiasis, amoebic dysentery, bacillary dysentery, typhoid fever, cholera, rotavirus gastroenteritis in children, viral hepatitis A, poliovirus, and many other waterborne infectious diseases. Consequently, a higher prevalence rate of infectious diseases in these countries in comparison with developed ones or countries with hygienic water supply. The preventive measure about this dilemma is obvious and straightforward which is performed by continuous high positive pressure within municipal water supply pipes. In countries with high rate of waterborne infections, they used to overcome the problem by dissolution a higher chlorine level into tap water. However, this procedure cannot withstand, as the level of chlorine will diminish to a very low level at remote areas from water purification plant. Therefore, a very low concentration or nil chlorine level allows an escape of bacteria, viruses and cysts. Giardia cysts required certain level of chlorine concentration in order to be destroyed. At lower water temperature, killing of Giardia cysts requires relatively high chlorine concentrations and long contact times [7]. The cysts are highly resistant and have the ability to survive for weeks to several months in cold water. They may also exist in city reservoirs and persist after water treatment, as the cysts are reluctant to traditional water treatment methods, such as chlorination and ozonolysis [8].

In the previous issue of Journal of Infectious Diseases and Therapy a study from Basrah, Iraq, revealed that abdominal cramps (85%) and diarrhea (75%) were the most frequent presenting symptoms of giardiasis [9]. The other less frequent symptoms were foul smelling greasy stool (31.8%), fever (25%), bloating (22%), constipation (16%), vomiting (9%), and anorexia (6.4%). To large extent, these results are in concordance with previous reports. A former study revealed that gastrointestinal manifestations of Giardia infection include diarrhea, abdominal cramps, greasy stools, flatulence, epigastric tenderness, and steatorrhea accompanied by malabsorption syndrome [10].

In resource-poor countries, the conventional method for diagnosing giardiasis includes microscopic examination of fecal material for Giardia cysts or trophozoites. This procedure has low sensitivity in comparison to improved methods which are based on immunodiagnostic fecal antigen detection or Polymerase Chain Reaction (PCR). These diagnostic tests include detection of Giardia antigen(s) by immunoassay diagnostic kits, and various nucleic acid amplification techniques which have the potential to become standard approaches for diagnosing Giardia infections [11].

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