Review of Giardiasisin Punjab, Pakistan.

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ABSTRACT:
Giardiasis is a gastro-intestinal disease caused by Giardia lambila. The disease is commonly found in children. The basic purpose is to check the prevalance of gastro intestinal parasite in <15 years children of both sexes. Almost all people in Pakiatan affected through this by using contaminated food, water, through feces and sexual contact. ELISA, Stool microscopy and rectal digital techniques are commonly used to identify, separate and study eggs, cyst and trophozoites. In Pakistan rural aeras are the major source of Giardiasis due to unavailability of pure water. The pervalanceof Giardia lambila was higher in females than males. It was observed that its prevalance is reduced the increasing age but mostly 1-15 years young individuals was more affected.

Key words:
Giardia lamblia, Children, Giardiasis, Pakistan, Contaminated water

Introduction:

THIS third and the last class of microbial pathogens is protozoa that have been studied from extreme conditions like marine and fresh water, damp soils, dry sand etc (Kanwal K. ana Arslan M. 2016). Giardiasis is an illness caused by protozoan*Giardia lamblia*.It is a gastrointestinal disease. It becomes sometime symptomatic as well as asymptomatic. It is epidemic and sporadic in its nature and cause malabsorption and diarrhea.It is a waterborne disease so called "swimming pool" disease. Giardiasis encounters both the male and females of all age group, but mostly it was observed in infancy and childhood stages.It can affect the neonatal stage in 4th postpartum day. This infection is high in children and its rate reduce with the growing age.This parasitic infection is become a basic reason of death and developmental deficiencies throughout the world (Khan AI. et al., 2010).

Agents:

Giardia agilis, Giardia muris and *Giardia duodenalis/Giardia lambliaare* the agents that causes giardiasis. *Giardia agilis* infect the amphibians like frogs. *Giardia muris* infect the birds and rodents. *Giardia duodenalis* infect the mammals including humans, dog and rabbits (GILLON J. 1983).*Giardia lamblia* is a zoonotic flagellate unicellular eukaroytic parasite in Diplomonadida order and family Hexamitidae.

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Giardia lamblia:

Giardia lamblia was firstly discovered by a scientist Antonie van Leeuwenhoek in 1681.He was famous as father of parasitology or microbiology (Elmendorf GH. et al.,2003). He was founded it into his stool sample.*Giardia lamblia* livein digestive system reproduce and passed into stool (Oetega RY. and Adam DR. 1997).

Morphology:

Giardia lamblia exist in two forms one is cyst and other is trophozoite. It has Four pairs of flagella two nuclei and a sucking disk on the ventral surface with which it absorbs nutrient from small intestine cause malabsorption by lashing movement of thread like flagella. Trophozoite is pear shape and 9.5 to 21um long and 5 to 15 um in width. Trophozoite form like tiny water droplets when see dorsally and swollen like a bowl from side appearance. The pattern of nuclei, median bodies and axonemes match to a mammal facial features. Trophozoite appear in liquid and soft stool.It is infectious form after excystion start to multiply by adhereing to the wall of small intestine.Cyst is oval shape and have a thick resistant wall around itself due to which it can survive for a long period outside the body.Cyst was 12um in length and 7-10 um in its width.Mature cyst has four nuclei curved median bodies and linear axonemes.It can survive in humidity and watery conditions. If a normal chlorine concentration was used for the purification of water upto 3 months at least.Cyst ingested cause excystation firstly in stomach and this go upto small

intestine and produce two trophozoites.*Giardia lamblia* have five chromosomes that are polyploid in nature mitochondria, peroxisomes,smooth endoplasmic reticulmn and various other cellular structures (Oetega RY. and Adam DR. 1997).

Symptoms:

Giardia lamblia showed some signs such as diarrhoea,abdominal cramps, bloating, weight loss or malabsorption,vomiting, nausea and iron deficiency and lack of appetite etc. These causes sever illness in human and sometime lead to the morbidity and mortility (Siddiqui HM. et al.,2018).

Life cycle:

Giardia lamblia have simple life cycle. It has two stages, one is infectious cyst stage and other is intestinal trophozoite stage.Cyst was ingested through the contaminated water,food and direct faecal contact. Excystation of ingested cyst cause the release of trophozoites in stomach and small intestine (Elmendorf GH. et al.,2003). In stomach acidic pH gastric juice and in small intestine pancreatic juice causes the break down of inert hard resistance wall of cyst to produce vegetative form trophozoites. It increasesits number asexually by the longitudinal binary fission in duodenum and early portion of jejunum. Encystation is a process in which a hard thick wall is wrap around the trophozoites to formation of round cyst structure.Some of the trophozoite trapped in villi and microvilli and cause illness and other go outside of the body through the stool (Oetega RY, and Adam DR. 1997).Giardia genome have twentyseven clan CA cystein proteases gene regulate and controle the trophozoite producton and encystation.Two process are associated during life cycle of gardia lamblia excystation and encystation. Excystation is a process in which ingested cyst wall is ruptured to free the trophozotic form that start illness by their replication and showing different symptoms. The encystation is a process in which the trophozoite change into cyst form again to release the cyst through the nitrogenous waste material so that an other host can ingest it to start another life cycle and so on.In which a hard thick wall is wrap around the trophozoites to formation of round cyst structure.The encsytation intiate when trophozoites releases a large number of secretory proteins called encystation- specific vesicles.These vesicles start to accumulate in the cell membrane of trophozoite to make a hard cyst wall. Cystein proteases was discovered in gardia that play a major role in the life cycle its survival and continuity of life cystein protease that degrade the surface proteins during excystation and breah the membrane of encystation–specific vesicles to release a copious amount of proteins that make the cyst wall (DuBois NK. et al., 2008).

Transmission:

Giardiasis prevalence was an emerging problem both in developind and developed countries. Transmission of *Giardia lamblia* occure through a number of factors which may be wide spread in it's transmission. The sources are both environmental and social as well as other developmental strategies of country system. In past transmission was considered only through water but new investigation give evidence of spreading through non-watering sources such as person to person contact (Nasser MA. et al., 2012).*Giardia lamblia* was transmitted through a varity of sources. As it is a waterborne disease so cyst of *Giardia lamblia*are mixed in ponds lake and water bodies resorces as human excrement through improper sewarge system. Water contaminated and drinking of such untreaded water cause a lot of water borne disease along with the giardiasis.*Gardia lamblia* also cause chronic diarrhea, malabsorption and growth retardation (Baldursson S. and Karanis P. 2011).This pathogen was also transmitted from person to person contact or through contaminated food or improper cooked food and raw vegetables. This caustive agent was also transmitted and prevaled through the unwashed hands contact indivdual to individual after toilt use or diapered change. Homsexual activties also included the oral-fecal involvement cause the transmisson of this disease.At least 10 cysts are enough to this infection (WOLFE SM. 1992).

Risk Factor:

The poverty, improper sewage system, poor personal conditions and poor sanitation. Limited and contaminated water resources,climate changes increasing population and food handlers these are some factors that related to distribution and

prevalence of giardiasis in developing countries Pakistan also include. It was also observed during survey that fingernails of primary school going children also susceptible of *Giardia lamblia*up to 14.28% in Lahore district (Ghani JJ. et al., 2016). There are chances that make a person to develop a disease efficiently. The increased risk factors that make the individual risky of *Giardia lamblia* was close relation with pests, farm animals, nail finger and dirty hand after toilet.Use or hand contact to other after a diapersed change. Contaminated food or uncooked meat and raw vegetables (Keysten SJ. Karjden S. and Warren RM.). Study from worldwide areas show that different factors are associated in the prevalence of this disease. In Pakistan parasitic infections become one of the biggest issues to be solved out. *Giardia lamblia* was mostly infected the children with less educated mothers and those children which intake raw vegetables drinking pond spring water or water from open areas and eaten meal without hand washing (Khan W. Nisa UN. and Khan A. 2017). Risk factors give a sign to spread a disease in acute form. Risk factors provide information of about the excent or limiting time of disease and other illness associated to it (Keysten SJ. Karjden S. and Warren RM.).

Epidemology:

Edidemological studies of giardiasis shows that the distribution of this agent is more in rural as compared to urban aeras. (LIIDO FJ. et al., 1998). For the epidemology of those infection stool sample was collected to detect ova and parasite detection. For this, different fresh sample was collected in both developing and developed countries.The 2% to 5% industrialized and 20% to 30% in under developed countries. Mostly case was asyptomatic. Mostly it was manifested in children upto 40%. Asymptomatic childrens are carriar of this pathogen and transmitted this infection their family and friends. This infection show symptoms within 1–2 weeks and some time several weeks or even upto months if infection is left untreated.Symptomatic patients have foul smelled stool with high fat deposition and high diarrheatic condition as loose motion. Stool of such patients does not contain blood (Ortega RY. and Adam DR. 1997).Immunology includes both humoral and cellular immune reaction to the *Giardia lamblia* which was generated the patient against infective agent. Antibodies are produce in the patient's body against agent to eradicate it.The immunoglobulin A(IgA) and IgM. Both antibodies fight to the causative agent and reduce its movement and attachment to the mucosal layer of small intestine (WOLFE SM.1992).

Diagnosis:

There are different methods to diagnose the *Giardia lamblia* i.e stool microscopy, digital rectal technique, ELISA, PCR etc. So to check the pathogen in vitro we have to collect stool sample, antigen, DNA intestinal fluid, tissue sample, biopsy specimens and other biological sample (Siddiqui HM. et al., 2018). The stool of *Giardia lamblia* positive patient's cyst contain*Giardia lamblia* specific antigen (GSA 65). Rabbit antiserum is used against the cyst by crossed-and-line-immuno-electrophrorasis and counter immune-electrophrorasis (CIE). Molecular weight of GSA is 65,000 (ROSOFF DJ. and STIBSS HH. 1986). The ELISA technique basically used for the detection of antigen in stool specimen. It is commonly available most rapid easy to diagnose and interpret. Formalin and polyvinyl alcohol used and stained by tricome stain technique. The tests also visually and spectro-photometrically by ELISA (ADDISS G.D et al., 1991). An enzyme The Triage parasite panel (BIOSITE Diagnostics, San Diego, Calif.) is also used for detection of antigen or antibody (GARCIA SL. SHIMIZU YR. and BERNARD NC. 2000). PCR is a multiplexreal-time assay that used for daily stool analysis. It is a time saving process and a lot number of samples obtained. It is mostly used for parasitic diarrheal infections, but used on the species specific DNA control (Verweij JJ. et al., 2004).

World wide prevalence:

Water born disease caused by parasites has world wide prevalence both in developed and under developing countries. It remained a major source of morbidity and mortality in the wrold. According to previous researches between 2004-2010, diarrhea caused in 4 billion people from which 1.6 million died per year and 62.5 million were Disability

adjusted Life Years (DALYs) (Baildursson S. and Karanis P. 2011). According to 2011-2016 worldwide report 381 protozoan parasitic diseases due to water were reported that caused 22 million people deaths per year (Efstratiou A. Ongerth E. J. and Karanis P. 2017).

Prevalence in Pakistan:

Untreated water, improper sewerage system, polluted irrigated water are the major causes of Giardiasis in Pakistan (Azizullah A. et al., 2011). It has been observed that 72 species of protozoan parasites can be transmitted by water. According to recent studies 65.5% samples were collected from tap water, ponds and drain water. The *Giardia spp* were 14.1% observes (Kanwal K. ana Arslan M. 2016). Form workers and their families are at the risk of *Giardia intestinals* infection due to contact with untreated water. According to 2017 researches in district D.I Khan, KPK 3 million Pakistanies are affected in each year, of which 1.2 million die (Tayyab M. et al., 2017).

Treatment:

There are different medicines were used to cure the giardiasis. Like; Metronidazole, Tinidazole, Ornidazole, Quinacrine, Furazolidone, Paromomycin, Albendazole abd Bacitracin zinc (HILL RD. and GARDNER BT. 2001).Mostly secnidazole and metronidazole are commonly used, but secnidazole is better than metronidazole. It absorbed with in few seconds. Secnidazole suspension 30mg/Kg body weight is used. It is called “One minute treatment” because single dose is enough for recovery %.(Khan AI. et al., 2010).

Precautions:

Precautions to prevent the disease are keep your environment neat and clean. Do not drink unhealthy water. Keep your environment neat and clean. Wash your hand after toilet and before eating anything. There should be proper sewerage system (Khan A.I. et al., 2010). Avoid oral sex and person to person contact (MEYERS D.J., KUHARIC A.H., AND HOLMES K.K. 1997). Eat healthy food. (Khan A.I. et al., 2010)

Conclusion:

Giardia specie is significant cause of diarrhoea and abdominal pain, especially in children, In whom it can be associated with long-term consequences on growth and development.In Pakistan, there is no better system for sewage disposal. The environment is very dirty, un-healthy and fowl smelling. The cyst can easily grow and survive in the environment. So there be proper disposal of waste material. There should be a mechanism to supply pure water. The first effect of this disease was asymptomatic, so every person should be checked by doctor as the early symptoms appear. It is difficult to collect stool from common Pakistani because no one want to touch by otherperson, so give them proper guiedness and awareness. Ther should be neat and clean houses, forms, streets, toilets etc. Also government should take steps to aware every person. Every religion give stress upon cleaniness but cleaniness is the basic and major part of religion Islam.

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