Nat. Volatiles & Essent. Oils, 2021; 8(1):11242-11249

Correlation between Giardia lamblia and Helicobacter pylori infections in patients of Wasit Province, Iraq

[1]Prof. Dr. Abdulsada A. Rahi ,[2]Raheeq F. Kadhim

[1,2]Wasit University/ College of Science

Abstract :

Gastrointestinal tract (GIT) infections caused by Giardia lamblia and Helicobacter pylori are among the wide-spread GIT infections in the world, especially countries with low quality of health system. The current study was conducted to evaluate the current infection status of G. lamblia and H. pylori and to find any correlation between the two infections at the incidence level with the age and gender of patients in Wasit Province, Iraq. For the sampling, 100 stool samples were examined for the presence of G. lamblia, using direct wet-smear microscopy, and H. pylori, using the detection of the bacterial antigen via the use of H. pylori antigen rapid test kit. The results demonstrated that G. lamblia was detected in 24 (24%) patients of 18 (18%) males and 6 (6%) females. For H. pylori, the infection was found in 24 (24%) patients of 20 (20%) males and 4 (4%) females. The infection rates for G. lamblia and H. pylori were significantly ($p \leq 0.05$) correlated with younger ages (high infection rates (14%) and (15%), respectively, were seen in age category of two to ten years old) and the male-based gender category. The current study demonstrates that Giardia lamblia and Helicobacter pylori infections usually occur in young males.

Keywords: Gastrointestinal tract infections, Giardia lamblia, GIT, Helicobacter pylori.

Introduction :

the flagellated protozoan named G. lamblia (also referred as G. intestinalis or G. duodenalis) is the parasitic organism that causes a widespread human gastrointestinal infection, which is also termed as lambliasis). The disease induces diarrhea due to eating and drinking contaminated food and water. This can occur in certain facilities, such as day-care centers, and traveler's attended areas, for example unhygienic restaurants. Asymptomatic colonization can lead to an acute or chronic diarrheal disease. Considering the disease's prevalence and link to poverty, the World Health Organization (WHO) has designated it as one of the globe's neglected illnesses (1). The fecal-oral pathway is used by this parasite to spread by consumption of pathogenic cysts, either directly or indirectly. After ingesting cysts, the incubation period lasts 9 to 15 days. Infection symptoms range from no symptoms to extreme watery diarrhea, abdominal discomfort, nausea, and loss of weight (2). Giardiasis can be diagnosed with certainty if Giardia trophozoites or cysts are found in stool samples. The patient should be rehydrated and treated for any electrolyte disturbances, if any are observed. The majority of experts recommend treating symptomatic giardiasis with an anti-giardia drug to lessen and minimize the length of symptoms, decrease disease dissemination, and avoid consequences (3) Gastroduodenal ulcer disease, gastric cancer, and various kinds of gastric and extragastric illnesses are all associated with Helicobacter pylori infection. It is necessary to periodically review H. pylori medical management due to altering epidemiological circumstances (e.g., immigration), evolving resistance scenarios with therapeutic consequences, and new understanding about pathogen eradication indications (4) As stated in the Kyoto Global Consensus Report, irrespectively of if the infected person exhibits any complaints, problems, or subsequent diseases, H. pylori gastritis should be regarded an infectious illness. Based on the European Maastricht V/Florence Consensus Declaration, anyone with H. pylori illness should be treated in order to get rid of the illness for good. The proponents of this theory claim that H. pylori can cause ulcers, gastric cancer, and gastric MALT

lymphoma in an unexpected manner (5). Pathogen removal treats H. pylori-caused gastritis and stops it from turning into further complications. It's been argued that this approach extends too far, since it promotes to eradication therapies that runs outside the stated reasons and eventually to a culture of check and treatment that numerous asymptomatic people would be treated without necessity. H. pylori elimination is connected with high expenses, a possibility of antibiotic resistance, as well as other negative outcomes (4,6). The current study was conducted to evaluate the current infection status of G. lamblia and H. pylori and to find any correlation between the two infections at the incidence level with the age and gender of patients in Wasit Province, Iraq.

Materials and methods :

Patients and specimens :

For the sampling, a total of 100 giardiasis and H. pylori-symptom-suffering patients (at all ages and from males and females), who attended Al-Kut General Teaching Hospital (Kut City, Wasit Province, Iraq), were subjected to collecting stool specimens (one sample/patient). The consents of patients were collected from each patient. The samples were collected during the period between January and July, 2021. Each sample was placed in a sterile plastic container. Later, the containers were cooled-transferred to a laboratory for doing the diagnostic tests.

Wet-smear based microscopy for the detection of Giardia lamblia :

One-hundred stool samples were examined for the presence of G. lamblia, using direct wet-smear microscopy. The method included the use of a slide with a drop of normal saline on it. Then, 5-10mg-weighed specimens (taken from different sites of the original stool sample) was placed on the drop and mixed together until it was completely homogenized. Following, a cover-slip was placed on the mixture to, then, be placed under a 40X-lense of a light microscope for the detection of Giardia trophozoites and/or cysts.

H. pylori antigen rapid test kit :

H. pylori was detected using H. pylori antigen rapid test kit (Weifang Kanghua, BiotechCo., Ltd, China). The test was done using the instructions that come with the kit. At brief, If the stool sample was solid, then, 50mg of the stool (from three different sites) was collected for performing the examination. If the sample was liquid stool, then, about 50µl (2 drops) of the specimens was taken and placed into the sample collection tube that contained the extraction buffer. Then, the mixture was shaken for better mixing of the components. Later, the processed samples were immediately examined using the kit steps. For the interpretation of the results, lines appeared on the test strip was visually concluded using the kit instructions. According to the manufacturer, the kit is about 99.57% and 99.56% of sensitivity and specificity, respectively.

Statistical analysis :

The data were analyzed and graphed using, GraphPad Prism v7.0 (GraphPad Inc., USA), via the use of Chi-Square.

Results :

Giardia lamblia :

The results demonstrated that G. lamblia was detected in 24 (24%) patients of 18 (18%) males and 6 (6%) females. The infection incidence of G. lamblia was significantly (p=0.009) correlated with the male-based gender category (Table 1 and figure 1).

Table 1: Incidence rates of Giardia lamblia according to the gender of patients

Gender	Incidence		Chi-Square	P value	Relative risk
	No.	%			
Males	18	18	6.82	0.009	3.7
Females	6	6			
Total	24	24			

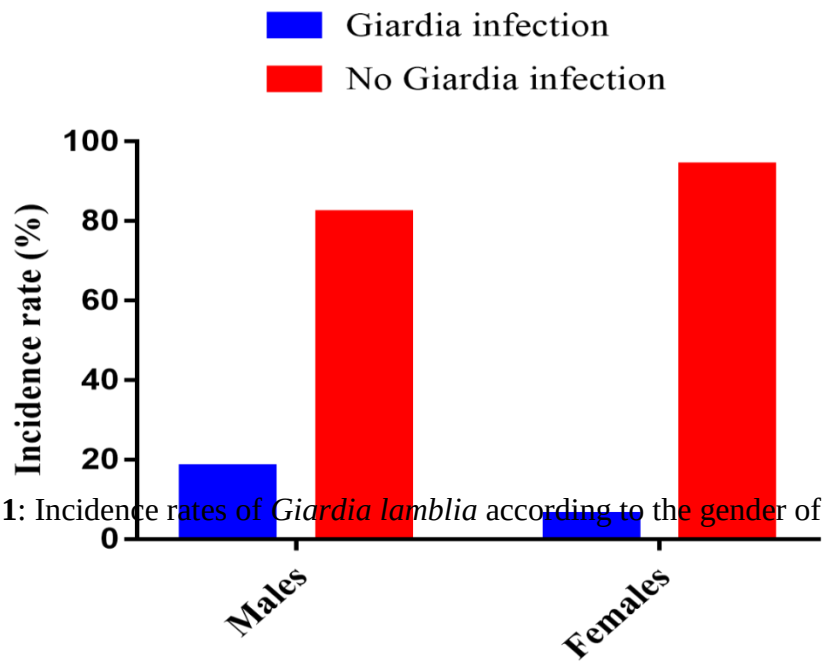

Figure 1: Incidence rates of *Giardia lamblia* according to the gender of patients.

Forpylori, the infection was found in 24 (24%) patients of 20 (20%) males and 4 (4%) females. The infection incidence of H. pylori was significantly (p=0.0006) correlated with the male-based gender category (Table 2 and figure 2).

Table 2: Incidence rates of H. pylori according to the gender of patients

Gender	Incidence		Chi-Square	P value	Relative risk
	No.	%			
Males	20	20	11.77	0.0006	4.3
Females	4	4			
Total	24	24			

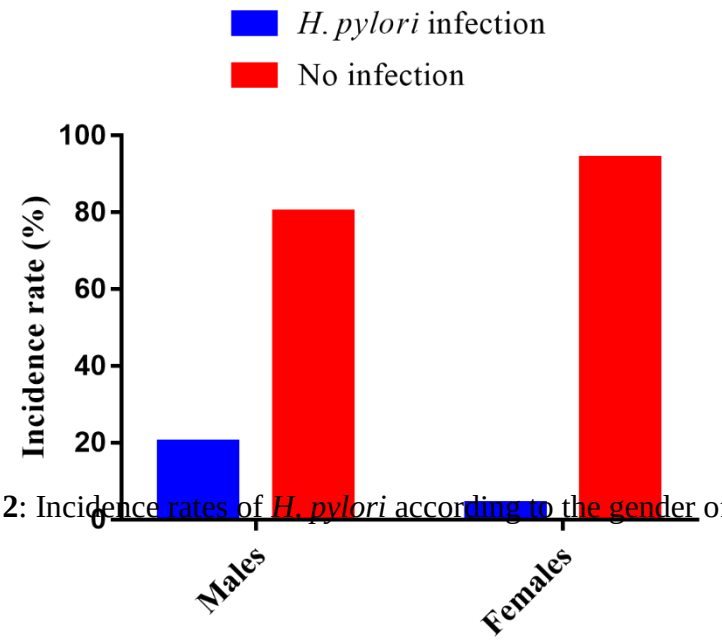

Figure 2: Incidence rates of *H. pylori* according to the gender of patients.

The incidence rate of G. lamblia was significantly (p=0.02) correlated with age (high infection rates were seen in age category of two to ten years old) (Table 3 and figure 3).

Table 3: Incidence rates of G. lamblia according to the age of patients

Age (years)	Incidence		Chi-Square	P value	Relative risk
	No.	%			
2-10	14	14	5.5	0.02	3.3
11-20	5	5			
21-30	5	5			
Total	24	24			

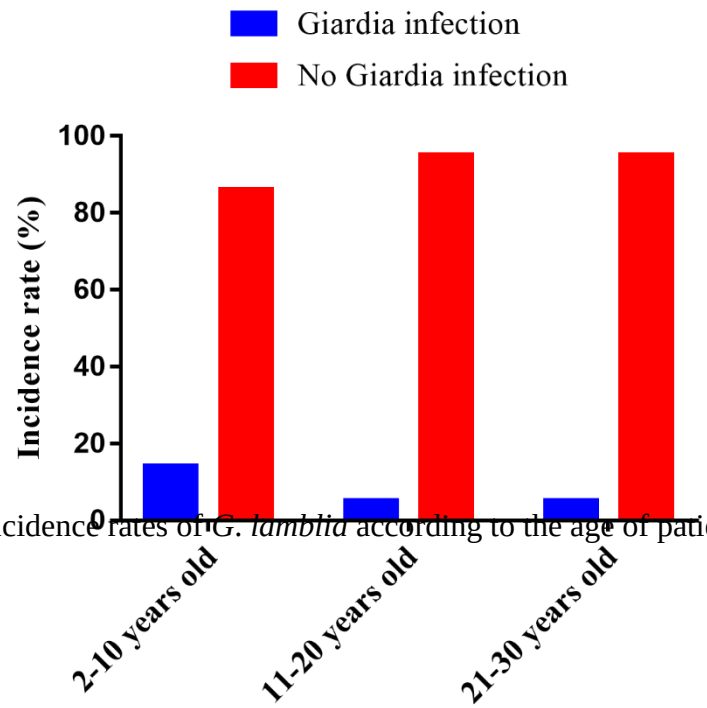

Figure 3: Incidence rates of *G. lamblia* according to the age of patients.

The incidence rate of H. pylori was significantly (p=0.0003) correlated with age (high infection rates were seen in age category of two to ten years old) (Table 4 and figure 4).

Table 4: Incidence rates of H. pylori according to the age of patients

Age (years)	Incidence		Chi-Square	P value	Relative risk
	No.	%			
2-10	15	15	13.32	0.0003	3.8
11-20	8	8			
21-30	1	1			
Total	24	24			

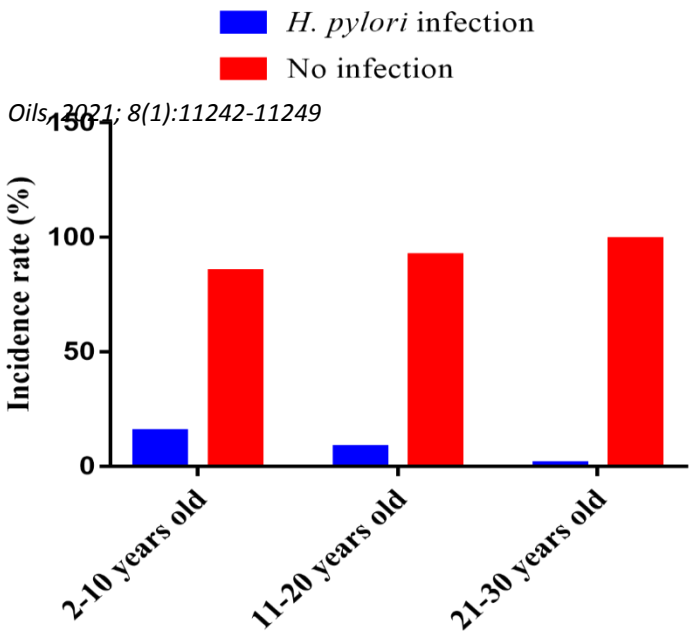

Figure 4: Incidence rates of *H. pylori* according to the age of patients.

Discussion :

Little is known about the correlation status between many bacterial or protozoal microorganisms with gender and the age of patients. The current study showed that there was a significant correlation between Giardia incidence and the male gender. This reflects that infection could be highly predicted with the presence of male gender as presented patient in the medical facilities. Our results agree with those by Samie et al (7), the male and female gender were in a race to take the top position with high infection rates, in which males come in the first place, and sometimes, females hold rank one in the percentage of infection by G. lamblia. The authors mentioned that the incidence rates in females (23.5%) were higher than that from males (13.3%) when the dominant type of the diarrhea was watery; however, this was the opposite when the stool was loose or formed to have higher rates in males (7). Samie et al (7) also reported that the infection rate was the highest in the age of between 3 to 20 years old, and this agrees with our findings, in which the younger ages were the highest in the incidence of the infection. In a study from Dohuk, Iraq, by Al-Saeed and Issa (8), The incidence rate of Giardia infection was 38.5% out of 1261 stool samples that were collected from children in orphan care centers, in which higher rates (48.1%) were seen, and in the pediatric hospital of the city, in which the lowest rate (31.3%) was detected. The authors recorded the highest rate (81.2%) of infection in 10-12 years old of the age category and the lowest rate (22.9%) in the 7-9 years old of the age group. The authors also reported that male children had the highest rate of infection than that in female children (8).

For H. pylori, the findings in the present work documented that the highest rates of infection were in male patients, especially those of age between 2 to 10 years old. In a study from Diyala Province, Iraq, AL-Ezzy (9) demonstrated that the total incidence rate was (22.64%), in which males were the highest in the incidence of the infection plus the age was positively correlated with infection rate. Khoder et al (10) reported that the infection rate (52.5%) was the highest in males in Abu Dhabi, United Arab Emirates plus the positively correlated with age. Our findings indicated that the highest rate of infection was in younger ages, and this could be due to different cultural habits for the younger ages, in which they follow certain unhealthy lifestyle when performing daily activities. Thus, in the developed countries, the older ages could more be affected and at risk of getting the infection. In Ramadi City, Iraq, Hussein et al (11) detected that the infection rate in the city was (67%), in which the highest rate was in males (69.6%) and ages of less

than 38 years old. These results are in agreements with our findings that refer to increases of risk rates for the infection in younger males of less than 30 years old.

Unfortunately, the literatures do not reliably identify these negative repercussions. It has been reported that H. pylori status had no effect on overall mortality in the prospective NHANES trial, which included 10,000 people (12–15). As a result of being conducted in an American community with high cardiovascular mortality and low frequency of both H. pylori infection and stomach cancer, this study is prone to being criticized as ineffective (4).

Conclusion :

The current study demonstrated that Giardia lamblia and Helicobacter pylori infections usually occur in young males.

References :

1. Leung A, Leung A, Wong A, Sergi C, Kam J. (2019). Giardiasis: An Overview. Recent Pat Inflamm Allergy Drug Discov ;13(2):34–9.
2. Ryan U, Cacciò S. (2013). Zoonotic potential of Giardia. Int J Parasitol ;43(12–13): 943–56.
3. Soares R, Tasca T. (2016). Giardiasis: an update review on sensitivity and specificity of methods for laboratorial diagnosis. J Microbiol Methods ;129(8):98–102.
4. Fischbach W, Malfertheiner P. (2018). Helicobacter Pylori Infection: When to Eradicate, How to Diagnose and Treat. Dtsch Arztebl Int ;115(25):436.
5. Sugano K, Tack J, Kuipers EJ, Graham DY, El-Omar EM, Miura S, et al.(2015). Kyoto global consensus report on Helicobacter pylori gastritis. Gut ;64(9):1353–67.
6. Malfertheiner P, Megraud F, O'Morain C, Gisbert J, Kuipers E, Axon A, et al.(2017). Management of Helicobacter pylori infection-the Maastricht V/Florence Consensus Report. Gut ; 66(1):6–30.
7. Samie A, Tanih NF, Seisa I, Seheri M, Mphahlele J, ElBakri A, et al.(2020). Prevalence and genetic characterization of Giardia lamblia in relation to diarrhea in Limpopo and Gauteng provinces, South Africa. Parasite Epidemiol Control ; 9(5): e00140.
8. Al-Saeed A, Issa S. (2006).Frequency of Giardia lamblia among children in Dohuk, northern Iraq. East Mediterr Heal J;12(5):555–61.
9. AL-Ezzy AIA. (2015). Evaluation of Clinicopathological and Risk Factors for Nonmalignant H. Pylori Associated Gastroduodenal Disorders in Iraqi Patients. Open Access Maced J Med Sci ; 3(4):654.
10. Khoder G, Muhammad JS, Mahmoud I, Soliman SSM, Burucoa C.(2019). Prevalence of Helicobacter pylori and Its Associated Factors among Healthy Asymptomatic Residents in the United Arab Emirates. Pathogens ;8(2):44.
11. Hussein RA, Al-Ouqaili MTS, Majeed YH. (2021). Detection of Helicobacter Pylori infection by invasive and non-invasive techniques in patients with gastrointestinal diseases from Iraq: A validation study. PLoS One ;16(8):e0256393.
12. Chen Y, Segers S, Blaser MJ. (2013). Association between Helicobacter pylori and mortality in the NHANES III study. Gut ;62(9):1262–9.
13. Zamani M, Vahedi A, Maghdouri Z, Shokri-Shirvani J. (2017). Role of food in environmental transmission of Helicobacter pylori. Casp J Intern Med ;8(3):152.

14. Diaconu S, Predescu A, Moldoveanu A, Pop C, Fierbințeanu-Braticevici C. (2017). Helicobacter pylori infection: old and new. J Med Life ;10(2):117.
15. Brito BB de, Silva FAF da, Soares AS, Pereira VA, Santos MLC, Sampaio MM, et al.(2019). Pathogenesis and clinical management of Helicobacter pylori gastric infection. World J Gastroenterol ; 25(37):5589.