Sohag University Sohag Medical Journal Faculty of Medicine

Evaluation of the relationship between Helicobacter Pylori infection and Irritable Bowel Syndrome

El-zahraa Mohammed Meghezel, Reham Mohy El-Den Kamel, Amr M Zaghloul.

***** Tropical Medicine and Gastroenterology Department, Faculty of Medicine, Sohag University

Abstract:

Introduction: Irritable bowel syndrome is a worldwide functional gastrointestinal illness, but its main cause is not definite. The primary cause of gastritis, peptic ulcers, and stomach cancer is Helicobacter pylori. The exact relation between H. pylori infection and IBS incidence is still indefinite.

Aim of the work: To assess any potential link between Helicobacter pylori infection and the incidence of irritable bowel syndrome.

Patients and method: In our study, we recruited 95 patients. They were divided into Group (1) including those who fulfilled the IBS diagnosis (in compliance with Rome IV criteria) named as a case group and a healthy control group with no IBS diagnosis as Group (2).

Every patient enrolled in the study completed a Questionnaire, complete physical examination, H. pylori stool antigen, and stool examination. Results: IBS patients were significantly (P value= 0.001) younger than the control group (32.35± 13.003 vs 41.60± 12.535). Most IBS patients were females (60%) but with no significant difference over males. H. pylori-positive patients were significantly (P value= 0.001) older than the control group (40.47± 12.572 vs 30 ± 13.149). However, there was no discernible gender or stress difference between the two groups. Age (P=0.000) and stress (P=0.000) were discovered through multivariate analysis to be independent predictors of IBS, although H. Pylori infection was not.

In conclusion, there was no connection between H. pylori infection and IBS.

Keywords: Irritable bowel syndrome, Helicobacter pylori

Abbreviations:

GIT: gastrointestinal tract, H. Pylori: Helicobacter pylori, IBS: Irritable bowel syndrome, MALT: mucosa-associated lymphoid tissue, SD: standard deviation

DOI : 10.21608/SMJ.2023.189932.1367

Introduction:

Irritable bowel syndrome (IBS) affects roughly 10% to 15% of people globally and is a functional gastrointestinal disorder.[(1)] The main symptoms are stomach pain and irregular bowel movements.[(2)]

Irritable bowel syndrome has an unidentified primary etiology. It could be due to a change in the gastrointestinal tract (GIT) and nervous system relationship.[(3)] Also, GIT mucosal inflammation, normal gut flora changes, and infection could be involved.[(4)] This leads to the modification of GIT mucosal permeability.[(5)]

Gastritis, peptic ulcers, gastric cancer, and gastric mucosa-associated lymphoid tissue (MALT) lymphoma are all primarily brought on by Helicobacter pylori (H. Pylori) .[6]

The systemic inflammation caused by H. pylori can increase GIT mucosal permeability. and alter the intestinal flora .[7] Mucosal lymphocyte infiltration leads to inflammatory mediators release, causing gut-brain axis affection. [8] Lastly, the continuing inflammation may arouse the hypothalamus-pituitary-adrenal axis (stress axis). [9]

However, the precise link between H. pylori infection and the occurrence of IBS is still up for discussion.[3]

Aim of the work:

To assess any potential link between Helicobacter pylori infection and the incidence of irritable bowel syndrome.

Patients and method:

In this prospective study, we recruited 95 patients referred to the Sohag Tropical Hospital outpatient clinic from 1 April 2021 to 1 April 2022. Patients were classified into 2 groups:

- Group (1) includes those who fulfilled the IBS diagnosis (in compliance with Rome IV criteria) named as a case group.
- Group (2) with no IBS diagnosis is a healthy control group.

Inclusion criteria:

Rome IV criteria for the diagnosis of IBS were used to determine the inclusion of all patients, and these include:

Recurrent abdominal discomfort that has occurred at least once per week for the past three months and meets two or more of the criteria below:

- Linked to defecation
- Linked to a change in stool frequency.
- Linked to a change in stool form.

Criteria met over the past three months with the onset of symptoms at least six months before diagnosis.[2]

Exclusion criteria:

These included any concerning symptoms that reduced the likelihood of IBS diagnosis:

- Anemia
- Rectal bleeding
- Onset beyond 50 years of age
- Weight loss
- Recent antibiotic use
- Abnormal abdominal examination (organomegaly, mass)
- A history of colorectal cancer in the family.
- A history of celiac disease, or inflammatory bowel disease in the family.

Ethical consideration:

The initiative received support from the Academic and Ethical Committee of Sohag University. Each patient had to complete an informed written consent form before participating in the trial. The Declaration of Helsinki, the World Medical Association's code of ethics for studies involving humans, guided the conduct of this study.

Methodology:

All included patients were subjected to the following:

- Questionnaire:

- The doctors told the patients about the survey and requested their free participation.
- Baseline patient characteristics, such as sex and age, were noted in the questionnnaire. After that, information about their symptoms, such as tummy ache or discomfort, diarrhea, and constipation, was gathered and added to the patient's medical records. We also inquired about any weight loss, rectal bleeding, colon cancer

in the family, inflammatory bowel illness, or celiac disease.

Questionnaire of irritable bowel syndrome patient:

1. Name
2. age of patient
3. Gender
4. Did you have any abdominal discomfort or pain?
5. Duration: > or < 6 months
6. Frequency: at least once/week in the last 3 months?
7. Did this pain or discomfort go away after a bowel movement?
8. Did you have more bowel motions (diarrhea) or fewer bowel motions (constipation) or both when this discomfort or pain started?
9. Were your stool (bowel motions) looser or harder when this discomfort or pain started?
10. Did pain relieve or aggravated by food?
11. if pain related to stress?
12. Did this discomfort or pain just happen when you were bleeding during your period and not at other times? (just for women)
13. if there is nausea/vomiting/gastroesphageal reflux/rectal bleeding/weight loss/anemia?
14. Did you have a history of (colon cancer/celiac disease/irritable bowel diseases as Crohns) in the family?
15. if the patient is treated with antibiotics.

Also, all patients underwent:

- Complete physical examination.
- H. pylori stool antigen
- Stool examination.
- Other routine investigations as Renal function, liver function, and blood sugar

Statistical analysis:

The Statistical Package for the Social Sciences (SPSS, version 17; SPSS Inc., Chicago, IL, USA) program was used to conduct the statistical analysis. Age is an example of parametric data that was expressed as mean standard deviation (SD). The non-parametric data, which were expressed as proportions like male and female, were examined using chi-square while the statistical evaluation was done using the student t-test. A p-value of 0.05 or less was regarded as significant.

Result:

Patient characteristics: We enrolled in this study 95 persons. The most were females 54 (56.8%), while 41 were males (43.2%) with a mean age of 38.26± 13.403 years. Sixty of them had IBS (63.2%) and 35 (36.8%) were healthy individuals as a control group (**Table 1)**.

Table 1. Characteristics of the study population

Parameters	**(N= 95)**
Age (mean± SD)	38.26± 13.403
Sex:	
- Male	41 (43.2%)
- Female	54 (56.8%)
IBS cases	60 (63.2%)

IBS patients were significantly (P value= 0.001) younger than the control group (32.35± 13.003 vs 41.60± 12.535). Most IBS patients were females (60%) but with no significant difference over males. IBS patients were significantly more affected by stress (66.67%) than the control group (28.57%) (**Table 2)**.

Table 2. Differences between IBS cases and controls

Parameters	IBS cases (N= 60)	Control (N= 35)	P value
Age (mean± SD)	32.35± 13.003	41.60± 12.535	**0.001**
Sex:			
- Male	24 (40%)	17 (48.6%)	0.416
- Female	36 (60%)	18 (51.4%)	
Stress	40(66.67%)	10 (28.57%)	0.000

Presentations of IBS: The predominant presentation of the IBS in our cases was abdominal pain for more than 6 months in 44 patients (73.3%), followed by diarrhea in 28 patients (46.7%), then mixed diarrhea and constipation (33.3%), then constipation in 8 patients (13.3%) and Abdominal pain was associated with nausea and reflux in 8 patients (**Table 3)**

Table 3. Presentations of IBS

Presentations of IBS	N= 60
abdominal pain > 6 months	44 (73.3%)
Diarrhea	28 (46.7%)
constipation	8 (13.3%)
Mixed diarrhea and constipation	20 (33.3%)
Nausea and Reflux	8 (13.3%)

74 (77.9%) persons were positive for the H. Pylori test. H. pylori test was positive in 44 patients of IBS patients (73.3%) and negative in 16 patients (26.7%), while it was positive in 30 of the control group (85.71%) and negative in 5 patients (14.3 %), with no significant difference (Table 4).

Table 4. IBS and H. Pylori

H. Pylori	IBS cases (N= 60)	Control (N= 35)	P value
Positive	44 (73.3%)	30 (85.7%)	
Negative	16 (26.7%)	5 (14.3 %)	0.161

Age (P=0.000) and stress (P=0.000) were identified by multivariate analysis to be independent predictors of IBS, although H. Pylori infection was not proven to be apre-dictor. **Table (5).**

Table (5). Multivariate analysis of predictors of IBS

	Significance	95.0% C.I.	
		Lower	Upper
Age	0.000*	1.070	1.212
Sex	0.819	Not applicable	Not applicable
Stress	0.000*	Not applicable	Not applicable
H. pylori infection	0.063	Not applicable	Not applicable

C.I.: Confidence interval

Discussion:

We enrolled 95 persons. The most were females 54 (56.8%), while 41 were males (43.2%) with a mean age of 38.26± 13.403 years. 60 of them had IBS (63.2%) and 35 (36.8%) were healthy individuals as a control group.

IBS patients were significantly (P value= 0.001) younger than the control group (32.35± 13.003 vs 41.60± 12.535). Many research, including **Ferreira et al.** [10] and **Olafsdottir et al.** [11] have revealed that between the ages of 26 and 55, IBS is more common in younger age groups. This may be the result of several factors, such as increased obligations from family and society at this age, family responsibilities, challenging coursework, and an inability to handle stress.[12]

Most IBS patients were females (60%) but with no significant difference over males. Also, in **Farzaneh et al.**[13] IBS study, 62.1% of the patients were females. **Latif et al.** [14] reported similar results over 184 cases. **Elhosseiny et al.** [15], **AlAmeel et al.** [16] and **Mohammad et al.** [17] found that most the IBS patients were females but there is no significant relation between IBS and gender. **Al-Damarchi and Al-Talakani.** [18] found that 63% of IBS patients were females but they found that there is a significant relation between IBS and gender.

The origins of this contentious gender disparity are unknown. Regarding the reduced incidence of IBS in postmenopausal women, **Pan et al.** [19] explained this gender gap as being caused by female hormones. According to **Chang and Heitkem-per .**[20] the majority of cases of IBS in women can be attributed to gender differences in GIT transit time, visceral hyperex-citability, neurological pain processing, neuro-endocrine, autonomic nervous system, and anxiety reactions.

The predominant presentation of the IBS in our cases was abdominal pain (73.3%), followed by diarrhea in 28 patients (46.7%), followed by mixed diarrhea ad constipation (33.3%), and constipation in 8 patients (13.3%). This was like the studies of **Celebi et al.** [21], **Foud et al.** [22], **Madrid-Silva et al.** [23], **Al-Damarchi and Al-Talakani.**[18] and **Mohammad et al.**[17] results that abdominal pain was the most common presentation followed by diarrhea, but for them, it was followed by constipation then mixed diarrhea and constipation.

H. Pylori test was positive in 74 (77.9%) persons. That was near the result of Egyptian studies of H. Pylori prevalence: [24] which was 75.7% and [25] was 70%, slightly higher than the studies of .[26,27] (62% and 64.3% respectively**),** but much higher than that in the study of **Sherif et al. (**46%) [28]. In both adults and children who are healthy and asymptomatic, Egypt has the highest frequency of H. pylori. According to an Egyptian study, residing in rural regions, being underweight and/or tall, having a lower level of education, and having a low socioeconomic status are all risk factors for H. pylori infection [29]. Many European populations revealed a significantly lower frequency, indicating better hygiene standards and less packed workplaces . [30]

73.3% of IBS patients tested positive for H. pylori, which was lower than the control group's rate (85.71%) but did not differ significantly from it. That went with an Iraqian study. [31] which showed that H pylori infection in IBS patients (43%) was less than that in healthy

people (58%) with no significant difference.

According to a study by **Antonio Barrios .** [32] conducted on 38 patients, 50% of them tested positive for H. pylori however, there was no evidence of a connection between H. pylori infection and IBS. Additionally, **Hasan et al.** [31] discovered that both IBS patients and controls had similar rates of H. pylori infection.

Furthermore, numerous investigations from countries such as **Sweden .**[33], **the United States** [34], **Japan** [35], **China** [36] **and** [5], **and India** [18] failed to find a link between H pylori and IBS. That was in contrast to a study by **He and Li** [37] that found a considerably greater rate of H pylori infection in IBS patients than in healthy individuals.

In conclusion, we discovered that the population under study had a high frequency of H. pylori infection. We did not discover a link between H. pylori infection and IBS.

References:

1. **Drossman DA, Camilleri M, Mayer EA, Whitehead WE.** AGA technical review on irritable bowel syndrome. Gastroenterology W B Saunders; 2002;123(6): 2108–31.
2. **Defrees DN, Bailey J.** Irritable Bowel Syndrome. Prim Care Clin Of Pract: 2017;44(4): 655-71.
3. **Drossman DA.** Functional Gastrointestinal Disorders: History, Pathophysiology, Clinical Features, and Rome IV. Gastroenterology W B Saunders 2016;150(6): 1262–1279.e2.
4. **Vanner SJ, Greenwood-Van Meerveld B, Mawe GM, Shea-Donohue T, Verdu EF, Wood J, et al.** Fundamentals of Neurogastroenterology: Basic Science. Gastroenterology W B Saunders 2016; 150(6): 1280–91.
5. **Xiong F, Xiong M, Ma Z, Huang S, Li A, Liu S.** Lack of Association Found between Helicobacter pylori Infection and Diarrhea-Predominant Irritable Bowel Syndrome: A Multicenter Retrospective Study. 2016;1–7
6. **Ford A C, Forman D, Hunt R H, Yuan Y, and Moayyedi P,** "Helicobacter pylori eradication therapy to prevent gastric cancer in healthy asymptomatic infected individuals: systematic review and meta-analysis of randomized controlled trials.," BMJ (Clinical research ed.), 2014; vol. 348.
7. **Yakoob J, Abbas Z, Naz S, Islam M, Jafri W.** Virulence markers of Helicobacter pylori in patients with diarrhea-dominant irritable bowel syndrome. Br J Biomed Sci 2012; 69(1): 6–10.
8. **Budzyński J, Kłopocka M.** Brain-gut axis in the pathogenesis of Helicobacter pylori infection. World J Gastroenterol 2014; 20(18): 5212.
9. **Collins S, McHugh K, Jacobson K, Khan I, Riddell R, Murase K, et al.** Previous inflammation alters the response of the rat colon to stress. Gastroenterology W B Saunders 1996; 111(6): 1509–15.
10. **Ferreira AI, Garrido M, Castro-Poças F.** Irritable Bowel Syndrome: News from an Old Disorder. GE Port J Gastroenterol. 2020;27(4):255-268

11. **Olafsdottir LB, Gudjonsson H, Jonsdottir HH, Thjodleifsson B.** Stability of the irritable bowel syndrome and subgroups as measured by three diagnostic criteria - a 10-year follow-up study. Aliment Pharmacol Ther. 2010;32(5):670-80

12. **Wani FA, Almaeen AH, Bandy AH, Thirunavukkarsu A, Al-Sayer TA, Flah A, et al.** Prevalence and risk factors of IBS among medical and nonmedical students in the Jouf university. Niger J Clin Pract. 2020;23(4):555-560.

13. **Farzaneh N, Ghobaklou M, Moghimi-Dehkordi B, Naderi N, Fadai F.** Effects of demographic factors, body mass index, alcohol drinking and smoking habits on irritable bowel syndrome: a case-control study. Ann Med Health Sci Res 2013; 3:391-396.

14. **Latif A, Aziz Memon F, Asad M.** Irritable Bowel Syndrome in a Population of a Developing Country: Prevalence and Association. Cureus. 2020;12(5):e8112

15. **Elhosseiny D, Mahmoud NE, Manzour AF.** Factors associated with irritable bowel syndrome among medical students at Ain Shams University. J Egypt Public Health Assoc.;94(1):23 Study. J Can Assoc Gastroenterol. 2019;3(6):e32-e36

16. **AlAmeel T, Roth LS, Al Sulais E.** The Prevalence of Irritable Bowel Syndrome Among Board-Certified Medical Doctors In Saudi Arabia: A Cross-sectional Study. J Can Assoc Gastroenterol. 2019;3(6):e32-e36.

17. **Mohammad A., Roshdy M., Abd Allah S..** Irritable Bowel Syndrome in Patients with Chronic Viral Hepatitis. The Egyptian Journal of Hospital Medicine, 2021;85(1), 3173-3178.

18. **Al-Damarchi, A.T., & Al-Talakani, G.A..** Association of helicobacter pylori and irritable bowel syndrome. Indian Journal of Public Health Research and Development, 2018; 9, 486.

19. **Pan CH, Chang CC, Su CT, Tsai PS.** Trends in irritable bowel syndrome incidence among Taiwanese adults during 2003 -2013: a population-based study of sex and age differences. PLoS One 2016; 11:e0166922 .

20. **Chang L, Heitkemper MM.** Gender differences in irritable bowel syndrome. Gastroenterology 2002;123:1686 -1701.

21. **Celebi S, Acik Y, Deveci SE, Bahcecioglu IH, Ayar A, Demir A, Durukan P**. Epidemiological features of irritable bowel syndrome in Turkish urban society. J Gastroenterol Hepatol. 2004 Jul;19(7):738-43.

22. **Fouad YM, Makhlouf MM, Khalaf H, Mostafa Z, Abdel Raheem E, Meneasi W.** Is irritable bowel syndrome associated with chronic hepatitis C? J Gastroenterol Hepatol. 2010 Jul;25(7):1285-8.

23. **Madrid-Silva AM, Defilippi-Caffri C, Landskron-Ramos G, Olguín-Herrera F, Reyes-Ponce A, Castro-Lara A, et al.** Prevalencia de síntomas de intestino irritable en

población asistente a centros comerciales de Santiago de Chile. The prevalence of irritable bowel symptoms in a population of shopping mall visitors in Santiago de Chile. Rev Gastroenterol Mex. 2013 Oct-Dec;78(4):203-10

24. **Mohammad MA, Hussein L, Coward A, Jackson SJ.** Prevalence of Helicobacter pylori infection among Egyptian children: Impact of social background and effect on growth. Public Health Nutr 2008; 11: 230-236

25. **Abu-Zekry MA, Hashem M, Ali AA, Mohamed IS.** Frequency of H. pylori infection among Egyptian children presenting with gastrointestinal manifestations. J Egypt Public Health Assoc 2013; 88:74-78.

26. **Ali AS, Borei MB.** H. pylori and Egyptian infantile colic. J Egypt Soc Parasitol 2013; 43:327-332.

27. **Diab M., El-Shenawy M., Shemis M. et al.** Helicobacter Pylori Infection in Egyptian Patients With Dyspepsia: Diagnostic, Demographic, Endoscopic And Clinical Characteristics. Int. J. of Adv. Res. 2018;226-234

28. **Sherif M, Mohran Z, Fathy H, Rockabrand D, Rozmajzl PJ, Frenck RW.** Universal high-level primary metronidazole resistance in Helicobacter pylori isolated from children in Egypt. Journal of Clinical Microbiology 2004;42: 4832–4

29. **Hooi JKY, Lai WY, Ng WK, Suen MMY, Underwood FE, Tanyingoh D, et al.** Global prevalence of Helicobacter pylori Infection: Systematic review and meta-analysis. Gastroenterology 2017; 26. pii: S0016-5085(17) 35531-2.

30. **Jaka H, Mushi MF, Mirambo MM, Wilson L, Seni J, Mtebe M, et al.** Sero-prevalence and associated factors of Helicobacter pylori infection among adult patients with dyspepsia attending the gastroenterology unit in a tertiary hospital in Mwanza, Tanzania. Afr Health Sci 2016; 16(3):684-689.

31. **Hasan AS, Jaafer AM, Athab AM.** Rate of Helicobacter pylori infection among patients with irritable bowel syndrome. Gulf Med J 2017; 6: 16-21

32. **Antonio Barrios, Adriana Barrios Fernandez, Angela Alvarez and Eviralda Méndez.** Helicobacter pylori Infection Is Associated with Development of Irritable Bowel Syndrome J of Exploratory Research in Pharmacology 2016; vol. 13-15

33. **Agréus L, Engstrand L, Svärdsudd K, et al.** Helicobacter pylori seropositivity among Swedish adults with and without abdominal symptoms. A population-based epidemiologic study. Scand J Gastroenterol 1995; 30:752–7.

34. **Locke CR, Talley NJ, Nelson DK, et al.** Helicobacter pylori and dyspepsia: a population-based study of the organism and host. Am J Gastroenterol 2000; 95:1906–13.

35. **Kawamura A, Adachi K, Takashima T, et al.** Prevalence of irritable bowel syndrome and its relationship with Helicobacter pylori infection in a Japanese population. Am J Gastroenterol 2001;96:1946

36. **Zhao Y, Zou D, Wang R, et al.** Dyspepsia and irritable bowel syndrome in China: a population-based endoscopy study of prevalence and impact. Aliment Pharmacol Ther 2010;32:562–72.

37. **He H, Li D**. Helicobacter pylori infection and irritable bowel syndrome 2009.