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

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## **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

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## **Introduction:**

Irritable bowel syndrome (IBS) affects ro-ughly 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 unide-ntified 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 invo-lved.(**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 brou-ght on by Helicobacter pylori (H. Pylori) .(**6)**

The systemic inflammation caused by H. pylori can increase GIT mucosal perm-eability. and alter the intestinal flora .(**7**) Mucosal lymphocyte infiltration leads to inflammatory mediators release, causing gut-brain axis affection. (**8**) Lastly, the con-tinuing inflammation may arouse the hyp-othalamus-pituitary-adrenal axis (stress axis). (**9**)

However, the precise link between H. pyl-ori infection and the occurrence of IBS is still up for discussion.(**3**)

**Aim of the work:**

To assess any potential link between Heli-cobacter 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 Ho-spital 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 So-hag University. Each patient had to com-plete an informed written consent form before participating in the trial. The Decla-ration 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 partici-pation.

- Baseline patient characteristics, such as sex and age, were noted in the question-nnaire. After that, information about their symptoms, such as tummy ache or disc-omfort, diarrhea, and constipation, was gathered and added to the patient's me-dical records. We also inquired about any weight loss, rectal bleeding, colon cancer in the family, inflammatory bowel illn-ess, or celiac disease.

**Questionnaire of irritable bowel syndrome patient:**

1. Name
2. age of patient
3. Gender
4. Did you have any abdominal disco-mfort 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 discomf-ort 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/gastro-esphageal 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 Sci-ences (SPSS, version 17; SPSS Inc., Chi-cago, IL, USA) program was used to con-duct the statistical analysis. Age is an ex-ample of parametric data that was expre-ssed as mean standard deviation (SD). The non-parametric data, which were expres-sed 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**  **- Female** | 41 (43.2%)  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**  **- Female** | 24 (40%)  36 (60%) | 17 (48.6%)  18 (51.4%) | 0.416 |
| **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 pati-ents (14.3 %), with no significant differ-ence (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%) | 0.161 |
| **Negative** | 16 (26.7%) | 5 (14.3 %) |

Age (P=0.000) and stress (P=0.000) we-re 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 m-ales (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 fam-ily and society at this age, family respo-nsibilities, 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 pat-ients were females but there is no sign-ificant relation between IBS and gender. **Al-Damarchi and Al-Talakani. (18)** found that 63% of IBS patients were fe-males but they found that there is a sign-ificant relation between IBS and gender.

The origins of this contentious gender disparity are unknown. Regarding the

reduced incidence of IBS in postmen-opausal women, **Pan et al. (19)** explained this gender gap as being caused by fem-ale 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, auton-omic nervous system, and anxiety reac-tions.

The predominant presentation of the IBS in our cases was abdominal pain (73.3%), followed by diarrhea in 28 pa-tients (46.7%), followed by mixed diar-rhea ad constipation (33.3%), and cons-tipation 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 abdo-minal pain was the most common prese-ntation followed by diarrhea, but for th-em, it was followed by constipation then mixed diarrhea and constipation.

H. Pylori test was positive in 74 (77.9%) persons. That was near the res-ult of Egyptian studies of H. Pylori prev-alence: **(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 asym-ptomatic, Egypt has the highest freq-uency of H. pylori. According to an Egy-ptian 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 signi-ficantly lower frequency, indicating bett-er 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 differ-ence.

According to a study by **Antonio Barr-ios . (32)** conducted on 38 patients, 50% of them tested positive for H. pylori ho-wever, there was no evidence of a conn-ection between H. pylori infection and IBS. Additionally, **Hasan et al. (31)** disc-overed that both IBS patients and cont-rols had similar rates of H. pylori infec-tion.

Furthermore, numerous investigations fr-om 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 freq-uency of H. pylori infection. We did not discover a link between H. pylori infec-tion and IBS.

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