

Prevalence of *Helicobacter pylori* Infection and Its Associated Factors Among Symptomatic Population in the India¹

*Saroj Kumar Thakur, **Dr. Potsangbam Kumar Singh

*Research Scholar, **Professor, CMJ University, Shillong, Meghalaya

DOI:10.37648/ijrmst.v15i01.004

Received: 25 November 2022; Accepted: 30 December 2022; Published: 27 January 2023

ABSTRACT

Introduction: Dyspepsia is a relatively frequent human experience that can be attributed to a wide variety of different factors. Patients see their doctors anywhere from four percent to fourteen percent of the time because they are suffering with dyspepsia, which is a collection of symptoms that pertains to the upper gastrointestinal system. In industrialised nations, the yearly incidence of the *H. pylori* infection ranges from 0.3 to 0.7 percent, but in underdeveloped countries, it ranges from 6 to 14 percent.

Objective: The purpose of this study is to evaluate risk factors associated with *H. pylori* infection and also to determine the prevalence of *H. pylori* among Indian subjects with dyspepsia using the stool antigen (HpSAg) and blood antibody strategy Immunoglobulin (IgG) test. Both of these objectives will be accomplished with the help of the stool antigen and blood antibody strategy Immunoglobulin (Ig^G) tests.

Material & Methods: The department of microbiology at the tertiary care centre played host to the cross-sectional study, which was conducted there between September 2019 and August 2021. The ages of the patients ranged from 13 to 77 years old, and a total of 89 blood and stool samples were taken from them. The Enzyme-Linked Immunosorbent Assay (ELISA) was used to test both samples for the presence of *H. pylori* in accordance with the instructions provided by the manufacturer.

Results: In all, 89 samples were taken from 120 patients. With regard to HpSAg, 32 (35.95%) of those samples were positive, while 57 (64.04%) were negative. With regard to Ig^G, 40 (44.95%) of those samples were positive, while 49 (55.05%) were negative. The IgG test results were significantly different from the HpSAg test results, with a P-value of 0.034 and an arrangement between a positive outcome of 47.5%. These discrepancies were statistically significant.

Conclusion: The HpSAg and Ig^G test is a simple, non-invasive, and accurate approach for evaluating whether or not *H. pylori* is present in a stool sample or a blood sample; nevertheless, its use for detection has to be researched..

Keywords: HpSAg, Ig^G, *H. pylori*, Dyspepsia, ELISA

¹ How to cite the article:

Thakur S.K., Singh P.K., Prevalence of *Helicobacter pylori* Infection and Its Associated Factors Among Symptomatic Population in the India, IJRMST, Jan-Jun 2023, Vol 15, 24-29, DOI: <http://doi.org/10.37648/ijrmst.v15i01.004>

INTRODUCTION

Dyspepsia is a relatively frequent human experience that can be attributed to a wide variety of different factors. Patients see their doctors anywhere from four percent to fourteen percent of the time because they are suffering with dyspepsia, which is a collection of symptoms that pertains to the upper gastrointestinal system. However, the prevalence of dyspepsia in the general population is far greater. Twenty percent to thirty percent of patients suffer from dyspeptic symptoms, and the majority of those people self-medicate their condition.^{1,2} *Helicobacter pylori* is a prevalent bacteria, and estimates suggest that about half of the world's population is infected with it.³ It has been postulated that the incidence of *H. pylori* infection is much higher in countries that have not yet undergone industrialization in contrast to countries that have undergone industrialization. There are a variety of forms of transmission that have been hypothesised by logical literary works. Some of these types include oro-oral transmission, faeco-oral transmission, gastro-oral transmission, gastro-gastric transmission, and transfer from one human to another.^{4,5} The yearly incidence of the *H. pylori* infection is between 0.3 and 0.7 percent in wealthy nations, while it ranges from 6 to 14 percent in poor countries.⁶ *Helicobacter pylori* is a Gram-negative bacterium that is thought to play a significant role in the development of chronic gastritis, gastric cancer, peptic ulcer illness, and lymphoid tissue lymphoma of the gastric mucosa. All of these conditions are characterised by inflammation of the stomach lining. All of these conditions are related to inflammation of the stomach lining. It is estimated that some percentage of the whole population is responsible for transporting this bacterium.^{4,7} In this study, we compared the *H. pylori* infection between a stool antigen test and a blood antibody test strategy IgG.⁸ Our goal was to determine which method is a more effective and trustworthy painless test for the recognition of *H. pylori* infection in symptomatic adult patients' population in India.

METHODS

The cross-sectional study was carried out in Department of Microbiology from September 2019 to August 2021 at Tertiary Care Center. A total 89 Blood and Stool samples from 120 patients were collected with age group between 13 to 77 years.

Inclusion Criteria

1. Subjects with side effects of dyspepsia.
2. Side effects more likely than not endured for at least 3 months or intermittent in nature over a similar period.
3. Subjects who gave informed agree to take part in the review.

Exclusion Criteria

1. Participants who had symptoms of dyspepsia for a period of fewer than ninety days before to the study.
2. Participants who were resistant to the therapy for *H. pylori* eradication.
3. Participants who had used proton pump inhibitor (PPI) or another medicine known to limit secretion within the previous month before to the test.
4. Participants who were given an anti-toxin therapy during the previous month, prior to taking the test.
5. Test subjects who had consumed bismuth compounds within the previous month prior to the examination.
6. Participants who had clinical manifestations of an illness caused by gastroesophageal reflux disease (GORD).

Sample Collection

○ Blood Sample for Serological Evaluation

A plain vial devoid of any anticoagulant was used to collect approximately 5 milliliters of venous blood from each patient.⁹The patient's name, together with the patient number and the date of collection, was written on the vial. The vial was heated in a water bath at 37⁰c for half an hour, or blood had been clotted. After the blood had been clotted, it was centrifuged, and the serum was aspirated into a few (200µl) Eppendorf tubes. These tubes were then stored at -70⁰c until they were analyzed.

○ Stool Sample for Antigen Detection

About 20 grams of stool were collected into a sterile container. All stoolsampleswerefrozenat-70⁰c until tested for *H. pylori* antigen.

○ Test Performed

Detection of *Helicobacter pylori* Antigen in Stool Specimens by ELISA

ELISA for the *H. pylori* antigen (monoclonal) in stool specimens was performed using a commercial test kit (Premier Platinum HpSAg Plus®, Meridian Bioscience Europe, Italy). The manufacturer's instructions were followed during the procedure.

Detection of Anti-*H. pylori* Ig^G in the Serum by ELISA

ELISA for the anti-*H. pylori* Ig^G antibody was performed using a commercial test kit (SERION ELISA® Classic *Helicobacter pylori* Ig^G, Serion, Germany). The manufacturer's instructions were followed during the procedure.

○ Statistical Analysis

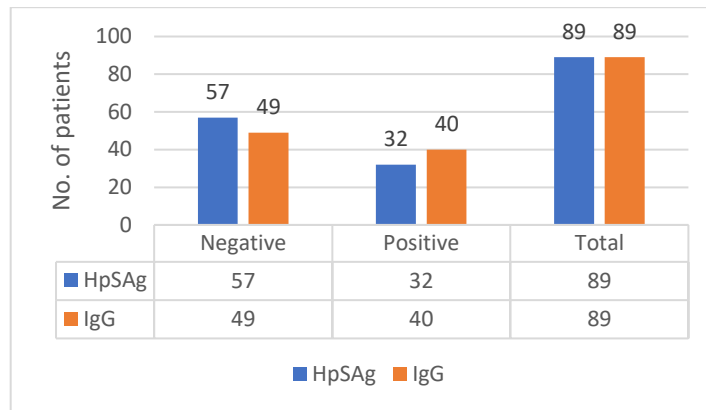
The results of the study were recorded systematically, and the statistical analysis of the data was performed using SPSS 20.0 for Windows 7. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of serum ELISA were calculated manually using a standard formula. The level of significance was set at P<0.05

RESULTS

The ages of the people who participated in the research varied from 13 to 77, with a mean of 37.03 years. Of the total population, 36.0% are females and 64.0% are male. Male made up around two thirds of those in the age range of 21-35 years old & according to the information contained in the persons between the ages of 21 and 35 years old had the most substantial improvement in their situation (51.1%). Out of 89 samples from 120 patients HpSAg, 32 (35.95%) were positive and 57 (64.04%) were negative whereas Immunoglobulin (Ig^G) 40(44.94%) were positive and 49 (55.05%) were negative shown in **Table No.1 & Graph No.1**

Table No.1: Distribution of positive and negative results

<i>H. pylori</i>	HpSag		Ig ^G	
	No.	%	No.	%
Negative	57	64.04	49	55.05
Positive	32	35.95	40	44.94
Total	89	100	89	100



Graph No. 1: Bar graph showing Distribution of positive and negative results

***H. pylori* Serum Ig^G**

The results of an ELISA test done on *H. pylori* serum Ig^G are listed in the **Table No.1** below. In accordance with the recommendations made by the manufacturer for deciphering the absorbances of serum tests, 40(44.94%) of the cases were considered to be definitive.

***H. pylori* antigen Detection from Stool"**

The finding of *H. pylori* antigen in faeces is receiving consideration from both administrative labs and medical professionals. According to the recommendation provided by the manufacturer for interpreting the absorbances of the removed stool samples, 32(35.95%) was considered to be certain **Table No.1**

Table No.2: Statistically significant differences in the findings of Ig^G and HpSag"

Ig^G in serum	HpSag				P- Value
	Negative		Positive		
	No	%	No	%	
Negative	36	73.46	13	26.53	0.034
Positive	21	52.50	19	47.50	
Total	57	64.04	32	35.95	

An evaluation of the Results of Measurable *H. pylori* Tests (Chi-square) "There were statistically significant differences between Ig^G, and HpSAg test results with a P-value of 0.034, as shown in **Table No. 2** & an arrangement between a positive outcome of 47.5%. The most significant source of motivation for *H. pylori* was found in the Ig^G test with a 44.94% followed by the HpSAg test with 35.95% **Graph No.1**

DISCUSSION

Methods for the detection of *H. pylori* infection are classically divided into noninvasive and invasive. Unfortunately, there is not a single test that can be relied on to identify *H. pylori* infection with absolute certainty at this time. A combination of tests is recommended as the greatest quality level available. It was essential for either the culture or the histology to be positive in addition to a positive fast urease test in order to categorise a patient as having *H. pylori*. This was one of the requirements for classifying a patient as having *H. pylori* (RUT).¹⁰ However, such an intrusive operation has significant drawbacks, including the need for anaesthesia, the potential for discomfort, and the likelihood of giving rise to ethical issues.

This research was carried out to evaluate the accuracy of the *H. pylori* stool antigen (HpSAg) test as a diagnostic and prognostic tool by observing the changes in the *H. pylori* stool antigen test both before and after eradication medication. In this study, the results for HpSAg were positive 32 (35.95%) of the time and negative 57 (64.04%) of the time. However, the results for Ig^G were positive 40 (44.95%) of the time and negative 49 (55.05%) of the time, as shown in **Table No.1 and Graph No.1** The evaluation of the results of measurable *H. pylori* Tests (Chi-square) "There were statistically significant discrepancies between the findings of the Ig^G test and the results of the HpSAg test, with a P-value of 0.034 in Table No.2 and an arrangement between a positive outcome of 47.5%,"

According to the findings of this study, the age group ranging from 21 to 35 years old had the most significant favorable results (51.1%).¹¹ There were no outcomes that could be considered measurable as essential, and all age groups were exposed to infection in the same manner. Similar study was conducted in Brazil, where the infection rate was found to be 84.7% in subjects aged 18 to 30 years old, growing to 92% in subjects aged 46-60 years old, and decreasing somewhat in individuals aged over 60 years old. The prevalence was highest in younger people.¹² The prevalence of infection did not increase much ($P = 0.147$) with increasing age, as a general rule. The author demonstrated highly surprising conclusions in one additional study that was conducted in the southern region of Brazil (2005). The prevalence rate of *H. pylori* infection was found to be 63.4% among the 563 individuals who met the criteria. In preliminary studies, a correlation was shown between pervasiveness and increasing age.¹³ There is not a significant difference in the prevalence of *H. pylori* infection in males and females in general. In addition, it appears as though the two of them have been exposed in the same manner.

The use of tea has been shown to have a protective effect which is a significant discovery from this research. Only 45.1% of the persons who consume tea were found to be contaminated, while the percentage of contamination was significantly greater among those who did not use tea 85.7%. The fact that tea is known to have medicinal effects may help to explain this phenomenon. This conclusion is supported by a Japanese paper that was published in 2011 about the benefits of tea.¹⁴

It turned out that the type of water consumed while intoxicated during adolescence was an unfavorable variable that was associated with significantly negative outcomes (P -value = 0.018). When compared with participants who drank separate water during their younger years, those who drank local or well water throughout their teenage years had a higher *H. pylori* infection rate (53.2%) & who drank filtered water is (16.7%). There is no statistically significant difference between coffee drinker, smokers, Martial status, weight, oral hygiene, drug consumption, sewage-garbage collecting system & type of accommodation.

CONCLUSION

The HpSag and Ig^G test is a non-invasive, straightforward, and accurate method for determining whether *H. pylori* is present in a stool & blood sample respectively; nonetheless, its utilization for determination has to be investigated. This study found no evidence that demographic characteristics or lifestyle habits such as age, sex, weight, marital status, smoking, coffee consumption, oral cleanliness status, socioeconomic status, education level, pay, type of convenience, number of occupants per convenience, number of occupants per room, type of water, the sewage system, contact with animals, international travel, or drug use were associated with *H. pylori* infection.

ACKNOWLEDGEMENT

We thank Education and Research Deputies of CMJ University supporting this work. We particularly thank faculties of microbiology department for supporting the work and providing all of the kits used in this work.

Financial support and sponsorship: Nil

Conflict of Interest: None

REFERENCES

1. Chiba N. (1998) Definition of dyspepsia: the time for reprisal. *Eur J Surg supplement*; 583:14-23.
2. Knill-Jones RP. (1985) A formal approach to the symptoms in dyspepsia. *Clinical Gastroenterol*;14:517-29.
3. Brown LM. (2000) *Helicobacter pylori*: epidemiology and the routes of transmission. *Epidemiol Rev*; 22(2): 283–97.
4. Olubuyide IO, Atoba MA, Ayoola EA. (1989) Dyspepsia in Ibadan. *Trop Geogr Med*;41(4):337-40.
5. Philippe L, Olzem Y. (2007) Epidemiology of the *Helicobacter pylori* infection: A year in *Helicobacter*, *Journal compilation*, Blackwell Publishing Ltd, *Helicobacter* 12 (suppl. 1):1-3.
6. Logan RPH, Walker MM. (2001) ABC of the upper gastrointestinal tract: the epidemiology and the diagnosis of the *Helicobacter pylori* infection. *BMJ*; 323(7318): 920–22.
7. Calam J. (1996) *A clinician's guide to Helicobacter pylori*: 1st ed. (Chapman and Hall, London);72-78.
8. Talley NJ, Phung N, Kalantar JS. (2001) ABC of the upper gastrointestinal tract: Indigestion: When is it functional? *BMJ*; 323:1294-1297.
9. Bergenzaun P., Kristinsson KG., Thjodleifsson B., Sigvaldadottir E., Mölstad S., et al., (1996) Seroprevalence of *Helicobacter pylori* in south Sweden and Iceland. *Scand J Gastroenterol*. 31(12):1157–1161
10. Björkholm B., Guruge J., Karlsson M., O'Donnell D., Engstrand L., et al, (2004) Gnotobiotic transgenic mice reveal that transmission of *Helicobacter pylori* is facilitated by loss of acid-producing parietal cells in donors and recipients. *Microbes Infect*. 6 (2): 213-220.
11. Milman N., Rosenstock S., Andersen L., Jorgensen T., Bonnevie O., (2014) Serum ferritin, hemoglobin, and *Helicobacter pylori* infection: A seroepidemiologic survey comprising 2794 Danish adults. *Gastroenterol*. 115 (2): 268-274.
12. Ciacci C., Sabbatini F., Cavallaro R., Castiglione F., Di Bella S., et al, (2004) *Helicobacter pylori* impairs iron absorption in infected individuals. *Dig Liver Dis*. 36(7):455–460
13. Björkstén B., Sepp E., Julge K., Voor T., Mikelsaar M., (2001) Allergy development and the intestinal microflora during the first year of life. *J Allergy Clin Immunol*. 108(4):516–520
14. Gold B., Khanna B., Huang L., Lee C., Banatvala N., (2013) *Helicobacter pylori* acquisition in infancy after decline of maternal passive immunity. *Pediatr Res*. 41 (5) :641–646.
15. Tomar, V. (2022). A Review on Procedure of QSAR Assessment in Organic Compounds as a Measure of Antioxidant Potentiality. *International Journal for Global Academic & Scientific Research*, 1(1), 7–12. <https://doi.org/10.55938/ijgasr.v1i1.2>