Short Communication
Advancements in Life Sciences – International Quarterly Journal of Biological Sciences

ARTICLE INFO

Date Received: 22/06/2022;
Date Revised: 22/08/2022;
Date Published Online: 31/10/2022;

Authors' Affiliation:
University Institute of Medical Laboratory Technology, The University of Lahore, Lahore - Pakistan

***Corresponding Author:**
Bushra Mubarak
Email: Bushra.mubarik@yahoo.com

How to Cite:
Nadeem H, Nawaz A, Nawaz A, Shams K, Mubarak B, (2022). Frequency of *Helicobacter Pylori* Infections and Its Associated Risk Factors in Patients Attending Tertiary Care Hospital of Bhakkar, Pakistan. Adv. Life Sci. 9(3): 323-327.

Keywords:
Helicobacter pylori; Stool antigen test; Risk factors; CBC

Editorial Note:
24 June 2025: You are viewing the latest version of this article having changes in the category section.

Open Access

Frequency of *Helicobacter Pylori* Infections and Its Associated Risk Factors in Patients Attending Tertiary Care Hospital of Bhakkar, Pakistan

Haider Nadeem, Aiman Nawaz, Arooj Nawaz, Komal Shams, Bushra Mubarak*

Abstract

Background: *Helicobacter Pylori* is a gram-negative bacteria that is the main cause of chronic gastritis and plays a significant role in peptic ulcers, gastric carcinoma, and gastric lymphoma. The prevalence of *H. pylori* cases is 75-90% worldwide. The objective of the study was to determine the frequency of *H. pylori* and its associated risk factors in the Bhakkar district.

Methods: A total of 102 participants with problems in the gastrointestinal tract were taken from June 2021 to May 2022. Stool antigen was performed to confirm *H. pylori* infection. A complete blood count (CBC) was also performed on the blood sample.

Results: The current study showed that a total of 102 samples were collected in this study. It was concluded that out of 102 participants, 63 (61.8%) were *H. pylori* positive and 39 (38.2%) were *H. pylori*-negative participants. Females were more infected with *H. pylori* 38 (60.3%) as compared to males 25 (39.7). The frequency of factors such as smoking (52% vs 51%), weekly consumption of junk food (52.4% vs 43.6%), fizzy drinks (33.3% vs 23.1%) and drinking of unfiltered water (54% vs 53%) was more in *H. pylori*-infected group compared with the uninfected group but difference was not statistically significant with odds ratio less than 1.

Conclusion: The current study concluded that female genders, ethnicities, and history of stomach infection are risk factors for *H. pylori*. Exposure to Smoking, unfiltered drinking water, fizzy drinks, and Junk food is more in the affected group than in the unaffected group.

Introduction

Helicobacter pylori (*H. pylori*), gram-negative bacteria are an inhabitant of the gastric mucosa of humans. *H. pylori* is the most common cause of stomach infections. 50% of the population gets infected globally with *H. pylori*. It was identified in 1982 by Dr. Barry Marshall and Dr. Robin Warren [1]. Self-ingestion experiments also documented that colonization of the human stomach by *H. pylori* leads to an inflammatory reaction in the gastric mucosa [2]. *H. pylori* mostly affect childhood, and it is asymptomatic most of later life. *H. pylori* penetrate the mucosal lining of the stomach resulting in gastrointestinal diseases mainly peptic ulcers, gastric ulcers, gastric cancer, mucosal lymphoid tissue lymphoma [MALT], and gastritis [1]. *H. pylori* is responsible for 80% of gastric ulcer cases. 60% of gastric ulcers lead to gastric cancer. Gastric cancer is sixth in terms of global cancer cases and second according to deaths by type of cancer. World Health Organization (WHO) has added *H. pylori* to the class I human carcinogen list. Screening of *H. pylori* at early stages helps prevent gastric cancer and peptic ulcer in most cases [3,4]. The worldwide prevalence of *H. pylori* is almost 50% with a relative increase in risk in underdeveloped countries [5]. The prevalence of *H. pylori* in Pakistan is 56-60% [6]. Prevalence fluctuates between countries and population groups within the same country. *H. pylori* remains highly prevalent among immigrants from countries with high prevalence in the coming decades [7]. Monitoring risk factors is very important to control the disease. Despite advancements in the medical field, infectious diseases can be disastrous claiming many lives and costing huge economic losses. *H. pylori* risk factors include crowded residences, low-quality food (including restaurant food or junk food), and unfiltered drinking water. People living in rural areas are highly affected because of no access to clean drinking water [8]. Poor personal hygiene and sanitary conditions are also leading to *H. pylori* infection. Poverty makes health care and necessary medication unaffordable for people with below-average income, as a result, they are more prone to *H. pylori* infections [9]. Age is also a risk factor for an increased rate of gastrointestinal diseases. *H. pylori*, affects children and persons above 50 years of age more, as compared to the young population.

Smoking is the most important cause of cancer worldwide. Smoking affects differently aiding *H. pylori* to cause infections and cancer. Instead of direct effect, smoking hinders the treatment and eradication of *H. pylori* and becomes a risk factor for its infections. Smoking affects metabolic activity thus in human and act as an important risk factor in case of stomach cancer. Because it contains many toxic and cancer-causing agents like nicotine and tar. More than 6000 toxic chemicals have been found in the smoke of cigarettes that affects the digestive tract and its functioning. Family history of having *H. pylori* infection and medication related to the digestive tract are also potential risk factors. *H. pylori* eradication treatment is becoming more challenging due to increasing antimicrobial resistance. Medications cause resistive patterns in *H. pylori*, due to which medicine to treat it proves ineffective. By keeping a check on risk factors spreading of disease can be minimized [10].

Practice good hygiene and hand washing, especially during food preparation. All patients with chronic gastrointestinal symptoms that may be associated with *H. pylori* infection should be tested and treated to prevent exposure to family members. Patients should complete the full course of therapy (antibiotics and acid blockers) to maximize the potential for a cure. Vaccine against *H. pylori* infections is in the early stages of clinical trials [11]. In the United States, Kumar S et al studied the risk factors and incidence of malignant tumors of the stomach in *H. pylori*-infected patients. They collected data from 371,813 patients from the Veterans Health Administration who had confirmed *H. pylori* infection from 1994 through 2018. The frequency of malignant growth at 5, 10, and 20 years after the recognition of *H. pylori* disease was 0.37%, 0.5%, and 0.65%. Patients who got therapy for the infection still had a risk of gastric cancer, but complete elimination of infection may reduce the risk of gastric cancer [12]. This study aims to find the frequency and risk factors associated with *Helicobacter pylori.*

Methods

A descriptive observational study was conducted on 102 patients with gastric problems from DHQ hospital, Bhakkar. The study was approved by the Ethical review committee of the institute. Informed written consent was obtained from all patients during this period. The questionnaire was filled out by people who had gastric symptoms such as name, age, gender, area, smoking, consuming junk food, and diabetes, and information about signs and symptoms and modes of transmission. Patients of all age groups with symptoms such as burning sensation and severe persistent pain in the abdomen, nausea, vomiting, loss of appetite, bloating, difficulty swallowing, and weight loss were included in the study. 3ml of blood samples in an EDTA and gel vacutainer and stool samples in a dry container were collected from each patient according to standard protocol. The CBC test was performed on an automated hematology analyzer (Swelab alfa), which was made in Sweden with EDTA blood. The Accu-Tell® *H. pylori* kit was used for *H. pylori* antibodies testing in the patient's serum separated by centrifugation of the gel vial samples. Stool samples were analyzed microscopically.

Statistical Analysis

Data entered into SPSS 23.0 (statistical package for social science, SPSS Ins., Chicago, IL, USA). For quantitative variables, mean ± standard deviation was used. Frequency and percentage were used for quantitative variables. A Chi-square test was used to find the association of factors between *H. pylori* positive and negative participants. The odd ratio was calculated by a logistic regression test. p-value less than 0.05 were considered statistically significant.

Results

A total of 102 samples were collected in this study. Forty-Five (44%) participants were male and fifty-seven (56 %) were female. In *H. pylori*-infected participant (Positive cases), the female percentage (60.3%) were high than the male (39.7%) (OR: 1.68). In *H. pylori*-negative participants (negative group), males (51.3 %) were more prevalent than females (48.7%). The mean age of Cases was 35.60± 14.9. The mean age of negative cases (*H. pylori*-negative group) was 33.28±15.8 (p=0.252). Participants, more than 30 years of age were more infected with *H. pylori* (Figure 1). Thirty-five (55.6%) cases belong to rural areas and (44.4%) cases belonged to urban areas (OD: 1.39) (Table 1).

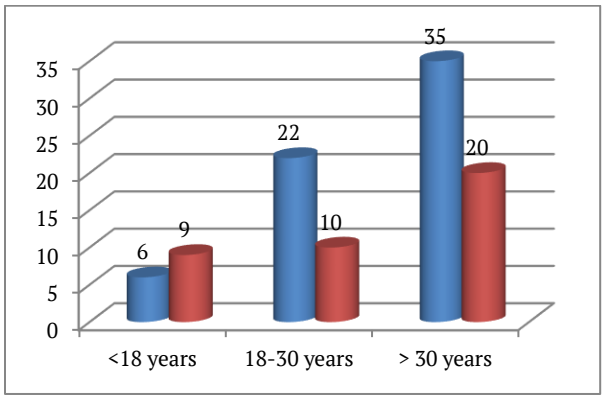

Figure 1: Age-Wise distribution of *H. pylori* positive and negative participants

Thirty-two (52%) *H. pylori*-positive cases were smokers compared with *H. pylori*-negative cases 20 (51%) (OD=0.83). The frequency of positive cases that were drinking unfiltered water was high 34 (54.0%) as compared to negative cases 21 (53%) (OD=0.83). Participants having stress among *H. pylori* cases were 32 % while in negative cases, it was 24 % (OD:1.73). The frequency of positive patients consuming fizzy drinks and junk food was non-significantly high in comparison with the negative patients (33.3% vs 23.1% OD: 0.79 and 52.4% vs. 43.6% OD: 0.94 respectively. Diabetes was not significantly associated with *H. pylori* infection (OD: 0.67). Cases having a history of stomach infections were infected with *H. pylori* more frequently than the *H. pylori*-negative group (OD: 1.24) (Table 2). Most of the *H. pylori*-positive patients had normal white blood cells (87.3%) and red blood cell count (93.7%) with a non-significant difference from the *H. pylori*-negative group (84.6% and 94.8% respectively).

Discussion

The prevalence of *H. pylori* varies from region to region. In the current study, 61.8% of participants were infected with *H. pylori* in Bhakkar. The frequency of *H. pylori* infection in Lahore was 7.9 % according to Sarwar et al study. This difference in frequency may be due to ethnicity differences because ethnicity is also associated with the *H. pylori* infection rate according to our study (OD:1.39) [13].

In the current study, patients were distributed into age groups such as under 18 years, 18-30, and above 30 years of age. The age group over 30 was the most affected group with 55.6% positive while under 18 years made 9.5% and 18-30 years was 34.9% positive. Subjects over 30 years of age were more infected with *H. pylori* bacteria in this study. This result is in agreement with Wawro N, et al. who reported that *H. pylori* infection increases with age [14].

In this current study, 52.0% of *H. pylori*-positive cases and 51 % of *H. pylori*-negative cases were smokers and smoking were not an associated risk factor with *H. pylori* in our study. Khalifa et al reported no statistically significant difference between smokers, non-smokers, and ex-smokers in the positivity rate of *H. pylori* [15].

The frequency of cases that were drinking unfiltered water was 34 (54.0%). The previous study conducted by Amara O on the association between the availability of clean water and *H. pylori* showed that 42.1 % of people who consume unfiltered water were infected with *H. pylori* [16]. Another study conducted previously by U. E. Rolle showed that out of the total, 80% of *H. pylori*-positive patients used contaminated water. The unfiltered water may be contaminated with *H. pylori* which caused infection in its consumers [17].

This study showed that in positive patients about 9.5% had diabetes while 55.9% were not diagnosed with diabetes. This showed that diabetes and *H. pylori* infection are not significantly related. A study conducted by Kamyar Mansori in 2020 showed that diabetic patients were 1.967 times more prone to developing *H. pylori* infection. *H. pylori* was diagnosed in 73.11% of the diabetic participants while 58.0% of non-diabetic patients [18].

About 32% of cases were stressed in our study. A previous study conducted by Takeoka in 2017 documented that there is a strong association between psychiatric disorders and *H. pylori* infection. Their study included 975 *H. pylori*-positive participants out of which

Variable		*H. pylori*-positive (N= 63)	*H. pylori*-negative (N= 39)	p-value	Odds Ratio (95% CI)
Age (mean±S.D)		35.60±14.9	33.28±15.9	0.46	-
Gender n (%)	Male	25 (39.7)	20 (51.3)	0.25	1.68 (0.71-3.96)
	Female	38 (60.3)	19 (48.7)		
Marital Status n (%)	Unmarried	25 (39.7)	20 (51.3)	0.25	1.68 (0.71-3.96)
	Married	38 (60.3)	19 (48.7)		
Ethnic n (%)	Urban	28 (44.4)	19 (48.7)	0.67	1.39 (0.57-3.42)
	Rural	35 (55.6)	20 (51.3)		

Table 1: Characteristics of *H. pylori*-positive and *H. pylori*-negative group

Factors		*H. pylori* positive Cases (n=63)	*H. pylori*-negative cases (n=39)	p-value	Odds ratio (95% CI)
Family History of *H. pylori*		30(47.6)	17(43.6)	0.68	0.83 (0.36-1.96)
Smoking n (%)		32 (52)	20(51)	0.962	0.98 (0.44-2.18)
Unfiltered water n (%)		34(54)	21(53)	0.99	0.83 (0.36-1.96)
Consumption of fizzy drinks n (%)	Daily	21(33.3)	9(23.1)	0.208	0.79 (0.43-1.20)
	Weekly	18(28.6)	13(33.3)		
	Monthly	24(38.1)	17(29.4)		
Consumption of junk food n (%)	Daily	12(19.0)	9(23.1)	0.860	0.94 (0.51-1.73)
	Weekly	33(52.4)	17(43.6)		
	Monthly	31(28.6)	13(33.3)		
Depression or Stress n (%)		33(32)	25(24)	0.236	1.73 (0.70-4.26)
History of Stomach infection n (%)		40 (58)	22 (56.4)	0.62	1.24 (0.52-2.94)
Diabetes n (%)		6(9.5)	3(7.7)	0.612	0.67 (0.14-3.13)
White Blood Cells n (%)	Below normal	5(7.9)	4 (10.3)	0.917	-
	Normal	55 (87.3)	33 (84.6)		
	Above Normal	3 (4.8)	2 (5.1)		
Red Blood Cells n (%)	Below normal	4 (6.3)	1 (2.6)	0.313	-
	Normal	59 (93.7)	37 (94.8)		
	Above normal	0 (0)	1 (2.6)		

Table 2: Odds Ratio of risk factors with *H. pylori* Infection

52.8% were with psychiatric disorders. 10.9% of patients who reported recurrence of infection had depression and stress while 6.2% of subjects who reported recurrence did not complain about any stress or depression [19]. A study by Zhang et al investigated *H. pylori* infection and associated risk factors in the general population in north-western China. They reported that the frequency of *H. pylori* was related to age, education level, profession, household earnings, and type of food [20]. In the Timergara community of Pakistan, smoking, snuff addiction, and regular soft drinks consumption have been linked to the increased risk of *H. pylori* infection [21]. An independent association between older age and increased salt consumption and *H. pylori* infection was found in the population of Kazakhstan. However, they reported no correlation between socioeconomic factors and *H. pylori* infection in the studied population [22]. CBC analysis showed a non-significant difference between the blood components of *H. pylori*-positive and the negative group. Bin Wahid et al have also reported that there is no difference in CBC parameters in the *H. pylori*-infected group [23]. The current study concluded that factors such as stress, female gender, history of stomach infection, and rural area demonstrated as risk factors for *H. pylori* infection. Exposure to smoking, fizzy drinks, unfiltered drinking water, and junk food was associated with *H. pylori* infections compared to the negative cases.

Competing Interest

We have read and understood ALS policy on declaration of interests and declare that we have no competing interests.

Author Contributions

Bushra Mubarak conducted the whole study from sample collection to data analysis and continuous monitoring of samples as well as wrote and edited the manuscript. Haider Nadeem and Arooj Nawaz collected and processed the samples. Komal Shams and Aiman Nawaz designed the study, searched the literature, and wrote the article.

References

1. McNicholl AG, O'Morain CA, Megraud F, Gisbert JP, Coordinators ASCotHEoBotN. Protocol of the European registry on the management of *Helicobacter Pylori* infection (Hp-EuReg). Helicobacter, (2019); 24(5): e12630.
2. Kusters JG, Van Vliet AH, Kuipers EJ. Pathogenesis of *Helicobacter Pylori* infection. Clinical microbiology reviews, (2006); 19(3): 449-490.
3. Moayyedi P, Hunt RH. *Helicobacter Pylori* public health implications. Helicobacter, (2004): 11(5): 967-72.
4. Khoder G, Muhammad JS, Mahmoud I, Soliman SS, Burucoa C. Prevalence of *Helicobacter Pylori* and its associated factors among healthy asymptomatic residents in the United Arab Emirates. Pathogens, (2019); 8(2): 44-53.
5. Kuo C-H, Hu H-M, Kuo F-C, Hsu P-I, Chen A, et al. Efficacy of levofloxacin-based rescue therapy for *Helicobacter Pylori* infection after standard triple therapy: a randomized controlled trial. Journal of Antimicrobial Chemotherapy, (2009); 63(5): 1017-1024.
6. Mehmood K, Awan AA, Muhammad N, Hasan F, Nadir A. *Helicobacter Pylori* prevalence and histopathological findings in dyspeptic patients. Journal of Ayub Medical College Abbottabad, (2014); 26(2): 182-185.
7. Atif AB, Yasrul Izad AB, Khan M. Prevalence of *Helicobacter Pylori* infection in Pakistani population. Research Journal of Pharmacy and Technology, (2017); 10(12): 58-58.
8. Aziz RK, Khalifa MM, Sharaf RR. Contaminated water as a source of *Helicobacter Pylori* infection: A review. Journal of advanced research, (2015); 6(4): 539-547.

9. Kotilea K, Bontems P, Touati E. Epidemiology, diagnosis and risk factors of *Helicobacter Pylori* infection. *Helicobacter Pylori* in Human Diseases, (2019); 178(31): 17-33.
10. Ferro A, Morais S, Pelucchi C, Aragonés N, Kogevinas M, et al. Smoking and *Helicobacter Pylori* infection: an individual participant pooled analysis (Stomach Cancer Pooling-StoP Project). European Journal of Cancer Prevention, (2019); 28(5): 390-396.
11. Papastergiou V, Georgopoulos SD, Karatapanis S. Treatment of *Helicobacter Pylori* infection: meeting the challenge of antimicrobial resistance. World Journal of Gastroenterology: WJG, (2014); 20(29): 9898-9909.
12. Kumar S, Metz DC, Ellenberg S, Kaplan DE, Goldberg DS. Risk factors and incidence of gastric cancer after detection of *Helicobacter Pylori* infection: a large cohort study. Gastroenterology, (2020); 158(3): 527-536. e527.
13. Sarwar N, Ahmed R, Saadullah M. ullah Khan K, Kamran S, Baig FA, et al. Prevalence of *Helicobacter Pylori* infection and its associated diseases in low socio-economic workers in tertiary care hospital of Lahore, Pakistan. Biomedical Letters, (2019); 5(1): 1-6.
14. Wawro N, Amann U, Butt J, Meisinger C, Akmatov MK, et al. *Helicobacter Pylori* Seropositivity: Prevalence, Associations, and the Impact on Incident Metabolic Diseases/Risk Factors in the Population-Based KORA Study. Frontiers in Public Health, (2019); 7.
15. Khalifa MAAA, Abd Almaksoud A. Cigarette smoking status and *Helicobacter Pylori* infection in non-ulcer dyspepsia patients. Egyptian Journal of chest diseases and tuberculosis, (2014); 63(3): 695-699.
16. Amaral O, Fernandes I, Veiga N, Pereira C, Chaves C, et al. Living conditions and *Helicobacter Pylori* in adults. BioMed research international, (2017); 17(3): 89-103.
17. Rolle-Kampczyk U, Fritz G, Diez U, Lehmann I, Richter M, et al. Contaminated well water: a risk factor for *Helicobacter Pylori* infection. WIT Transactions on Ecology and the Environment, (2004); 77(17): 675-691.
18. Mansori K, Dehghanbanadaki H, Naderpour S, Rashti R, Moghaddam AB, et al. A systematic review and meta-analysis of the prevalence of *Helicobacter Pylori* in patients with diabetes. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, (2020); 14(4): 601-607.
19. Takeoka A, Tayama J, Kobayashi M, Sagara I, Ogawa S, et al. Psychological effects of *Helicobacter Pylori* -associated atrophic gastritis in patients under 50 years: A cross-sectional study. Helicobacter, (2017); 22(6): e12445.
20. Zhang F, Pu K, Wu Z, Zhang Z, Liu X, et al. Prevalence and associated risk factors of *Helicobacter Pylori* infection in the Wuwei cohort of north-western China. Tropical Medicine & International Health, (2021); 26(3): 290-300.
21. Shah SRH, Almugadam BS, Hussain A, Ahmad T, Ahmed S, et al. Epidemiology and risk factors of *Helicobacter Pylori* infection in Timergara city of Pakistan: A cross-sectional study. Clinical Epidemiology and Global Health, (2021): 167(21): 789-803
22. Mezmale L, Polaka I, Rudzite D, Vangravs R, Kikuste I, et al. Prevalence and potential risk factors of *Helicobacter Pylori* infection among asymptomatic individuals in Kazakhstan. Asian Pacific Journal of Cancer Prevention: APJCP, (2021); 22(2): 597-606.
23. Wahid SB, Waqar M, Rehman Z, Wasim M, Idrees M. Prevalence of HCV-*Helicobacter Pylori* co-infection and its effects on liver function enzymes of patients in Lahore, Pakistan. BioScientific Review, (2019); 1(3): 09-14.