ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 11, Issue – 4, July – 2026, Page No. : 16 – 22

Association of Sociodemographic Factors and Clinical Subtypes with Helicobacter Pylori Infection in Patients with Non-Ulcer Dyspepsia: A Cross-Sectional Study from North India

[1]Surya Kumar Shukla, Department of General Medicine, KPS PG Institute of Medicine, GSVM Medical College, Kanpur, India

[1]B.P. Priyadarshi, Department of General Medicine, KPS PG Institute of Medicine, GSVM Medical College, Kanpur, India

[2]Vinay Kumar, Department of Gastroenterology, GSVM Medical College, Kanpur, India

[1]Brijesh Kumar, Department of General Medicine, KPS PG Institute of Medicine, GSVM Medical College, Kanpur, India

[3]Mahendra Singh, Department of Pathology, GSVM Medical College, Kanpur, India

[4]Tanu Midha, Department of Community Medicine, GSVM Medical College, Kanpur, India

[5]Suraiya K. Ansari, Department of Microbiology, GSVM Medical College, Kanpur, India

Corresponding Author: Surya Kumar Shukla, Department of General Medicine, KPS PG Institute of Medicine, GSVM Medical College, Kanpur, India

Citation this Article: Surya Kumar Shukla, B.P. Priyadarshi, Vinay Kumar, Brijesh Kumar, Mahendra Singh, Tanu Midha, Suraiya K. Ansari, "Association of Sociodemographic Factors and Clinical Subtypes with Helicobacter Pylori Infection in Patients with Non-Ulcer Dyspepsia: A Cross-Sectional Study from North India", IJMSIR – July – 2026, Vol – 11, Issue – 4, P. No. 16 – 22.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Helicobacter pylori infection is common among patients with non-ulcer dyspepsia (NUD) in developing countries, but the influence of sociodemographic and clinical factors including age, sex, residence and on dyspepsia subtype and H. pylori positivity remains variably reported across regions of India. This study examined these associations in a north Indian tertiary care population.

Methods: A hospital-based cross-sectional study was conducted on 150 adult patients with NUD diagnosed by Rome IV criteria. All patients underwent upper gastrointestinal endoscopy with biopsy, and H. pylori status was determined by rapid urease test (RUT). Patients were categorised by age group, sex, residence (rural/urban), and NUD subtype (postprandial distress syndrome [PDS] or epigastric pain syndrome [EPS]). Associations with H. pylori positivity were assessed using the Chi-square test, with $p<0.05$ considered significant. Odds ratios (ORs) with 95% confidence intervals were calculated. Multivariable logistic regression was performed to identify independent predictors of H. pylori positivity.

Results: H. pylori infection was detected in 72 of 150 patients (48.0%). A significant association was observed between age group and H. pylori positivity (p=0.001),

with the highest infection rate in the 31–45 years group (41.7% of positives) and the lowest in patients aged >60 years (11.1%). H. pylori positivity was numerically higher in males (66.7%) than females (33.3%), but this difference was not statistically significant (p=0.06). A higher proportion of positive patients resided in rural areas (69.4% vs 30.6% urban), though this association did not reach significance (p=0.07). No significant association was found between NUD subtype and H. pylori status (PDS 50.7% vs EPS 45.8% positive; p=0.44).

Conclusion: H. pylori infection in NUD shows a significant age-related distribution, with peak positivity in young to middle-aged adults (31–45 years), while sex, residence, and NUD subtype were not significantly associated with infection status in this population. Age-targeted clinical suspicion may improve the yield of H. pylori testing in NUD patients.

Keywords: Helicobacter pylori, non-ulcer dyspepsia, age distribution, sex distribution, rural residence, postprandial distress syndrome, epigastric pain syndrome

Introduction

Non-ulcer dyspepsia (NUD), also termed functional dyspepsia, is one of the most common functional gastrointestinal disorders, affecting approximately 10–20% of the general population worldwide and accounting for a substantial proportion of outpatient gastroenterology consultations.[1,2]

According to the Rome IV criteria, NUD is subclassified into postprandial distress syndrome (PDS), characterised predominantly by meal-related fullness and early satiety, and epigastric pain syndrome (EPS), characterised predominantly by epigastric pain or burning.[3,4]

Helicobacter pylori infection remains highly prevalent in India, with seroprevalence studies historically reporting infection rates exceeding 60–70% in some populations, and exposure occurring early in life.[5,6] However, the relationship between H. pylori infection and sociodemographic characteristics of NUD patients — including age, sex, and place of residence — has shown considerable regional heterogeneity across Indian and South Asian studies, with some studies reporting a clear age- or sex-related gradient and others finding no significant association.[7,8]

Similarly, whether the clinical subtype of NUD (PDS versus EPS) correlates with the presence of H. pylori infection remains debated, with implications for whether subtype-based phenotyping can help predict underlying infection.[9] Identifying which sociodemographic and clinical subgroups of NUD patients carry a higher burden of H. pylori infection could help direct screening efforts more efficiently in resource-constrained settings.

This study was therefore undertaken to evaluate the distribution of H. pylori infection across age groups, sex, residence (rural versus urban), and NUD clinical subtype among patients with non-ulcer dyspepsia attending a tertiary care hospital in north India.

Materials and Methods

Study Design and Setting

A hospital-based cross-sectional study was conducted at the Department of General Medicine and Gastroenterology, KPS Post Graduate Institute of Medicine, Lala Lajpat Rai Hospital, affiliated with GSVM Medical College, Kanpur, Uttar Pradesh, India, from August 2024 to February 2026, after obtaining approval from the Institutional Ethics Committee of GSVM Medical College, Kanpur.

Study Population and Sample Size

The study population comprised adult patients (age ≥18 years) presenting with dyspeptic symptoms who underwent upper gastrointestinal endoscopy and were diagnosed with NUD by Rome IV criteria after exclusion

© 2026 IJMSIR, All Rights Reserved

of organic disease. The sample size was calculated using the formula $n = (Z^2 \times p \times q) / d^2$, assuming a prevalence of 50%, 95% confidence level (Z=1.96), and absolute precision of 8%, yielding a required sample size of 150 patients.

Inclusion and Exclusion Criteria

Patients were included if they were ≥18 years of age, presented with dyspeptic symptoms for ≥3 months with onset ≥6 months prior to diagnosis, underwent upper GI endoscopy, had no peptic ulcer disease on endoscopy, and provided written informed consent.

Patients were excluded if they had peptic ulcer disease, gastric malignancy, erosive gastritis/ oesophagitis/ duodenitis, previous gastric surgery, recent use of antibiotics, proton pump inhibitors, or bismuth, severe systemic illness, pregnancy or lactation, or prior H. pylori eradication therapy.

Data Collection and Classification

Demographic data (age, sex, residence) and clinical NUD subtype (PDS or EPS, classified according to Rome IV criteria based on the predominant symptom pattern) were recorded using a predesigned structured proforma. Age was categorised into four groups: 18–30, 31–45, 46–60, and >60 years. Residence was classified as rural or urban based on the patient's self-reported permanent address.

Helicobacter pylori Detection

H. pylori infection was detected using the rapid urease test (RUT) performed on gastric biopsy specimens obtained during upper GI endoscopy. Two biopsy samples from the gastric antrum and/or corpus were collected and placed in urea-containing medium with a pH indicator; a colour change from yellow to pink/red within the specified time was considered RUT-positive.

Statistical Analysis

Data were analyzed using SPSS version 26. Continuous variables were expressed as mean ± standard deviation and categorical variables as frequency and percentage. Associations between categorical variables and H. pylori infection were assessed using Chi-square or Fisher's exact test where appropriate. Odds ratios (OR) with 95% confidence intervals (CI) were calculated. Variables with $p<0.20$ on univariate analysis were entered into multivariable logistic regression. A p-value <0.05 was considered statistically significant.

Results

Of the 150 patients with non-ulcer dyspepsia included in the study, H. pylori infection was detected in 72 (48.0%) and was absent in 78 (52.0%).

Age-wise Distribution

Among H. pylori-positive patients, the highest proportion belonged to the 31–45 years age group (41.7%), followed by the 18–30 years group (25.0%). H. pylori negativity was more common in older age groups, particularly 46–60 years (51.3%). The association between age group and H. pylori infection was statistically significant (p=0.001) (Table 1).

Table 1: Association between age group and H. pylori infection

Age Group	Positive n (%)	Negative n (%)	p-value
18–30 years	18 (25.0)	0 (0.0)	0.001*
31–45 years	30 (41.7)	14 (17.9)	

© 2026 IJMSIR, All Rights Reserved

46–60 years	16 (22.2)	40 (51.3)	
>60 years	8 (11.1)	24 (30.8)	
Total	72 (100.0)	78 (100.0)	

*Statistically significant ($p<0.05$)

Sex-wise Distribution

H. pylori positivity was higher in males (66.7%) compared to females (33.3%); however, the association between sex and H. pylori infection was not statistically significant (p=0.06) (Table 2).

Table 2: Sex-wise distribution of H. pylori infection

Sex	H pylori Positive n (%)	H pylori Negative n (%)	p-value
Male	48 (66.7)	40 (51.3)	0.06
Female	24 (33.3)	38 (48.7)	
Total	72 (100.0)	78 (100.0)	

Residence-wise Distribution

A higher proportion of H. pylori-positive patients were from rural areas (69.4%) compared to urban areas (30.6%), but the association was not statistically significant (p=0.07) (Table 3).

Table 3: Residence-wise distribution of H. pylori infection

Residence	H pylori Positive n (%)	H pylori Negative n (%)	p-value
Rural	50 (69.4)	42 (53.8)	0.07
Urban	22 (30.6)	36 (46.2)	
Total	72 (100.0)	78 (100.0)	

NUD Subtype and H. pylori Status

PDS was present in 34 (50.7%) H. pylori-positive and 33 (49.3%) H. pylori-negative patients, while EPS was present in 38 (45.8%) positive and 45 (54.2%) negative patients. No statistically significant association was found between NUD subtype and H. pylori infection (p=0.44) (Table 4).

Table 4: NUD subtype and H. pylori status

Subtype	Positive n (%)	Negative n (%)	p-value
Postprandial Distress Syndrome	34 (50.7)	33 (49.3)	0.44
Epigastric Pain Syndrome	38 (45.8)	45 (54.2)	
Total	72 (100.0)	78 (100.0)	

© 2026 IJMSIR, All Rights Reserved

Discussion

This study examined the sociodemographic and clinical subtype distribution of H. pylori infection among 150 patients with non-ulcer dyspepsia attending a tertiary care centre in north India, with an overall prevalence of 48.0%.

The most notable finding was the significant association between age group and H. pylori positivity (p=0.001), with peak infection in the 31–45 years age group (41.7%) and a markedly lower rate in patients aged >60 years (11.1%). This pattern is broadly consistent with the findings of Dutta et al, who studied 1000 dyspeptic patients at a tertiary centre in south India and reported the highest H. pylori frequency (48.3%) in the 31–50 years age group, with a decline to 34.9% in patients above 50 years.[10] Similarly, Gill et al, in an early Indian seroprevalence study, demonstrated that exposure to H. pylori occurs early in life and that age-related prevalence patterns in India differ from those of developed countries, consistent with predominantly childhood and early-adult acquisition followed by a plateau or decline in older age groups.[5] The lower prevalence in the oldest age group in the present study may reflect either a cohort effect of declining transmission in more recent birth cohorts, or possible spontaneous clearance of infection with age, both of which have been postulated in the literature.[11,12]

H. pylori positivity was numerically higher in males (66.7%) than females (33.3%), although this difference did not reach statistical significance in the present study (p=0.06). This finding is in partial contrast to Dutta et al, who found male sex to be a significant independent risk factor for H. pylori infection (45.7% in men vs 33.2% in women; p<0.001) in a much larger sample.[10] The smaller sample size of the present study (n=150) compared with the 1000-patient cohort of Dutta et al may have limited statistical power to detect a sex-based difference of similar magnitude, and the observed trend toward higher male positivity is directionally consistent with that and other Indian studies.[13]

A higher proportion of H. pylori-positive patients in this study were from rural areas (69.4%) compared with urban areas (30.6%), though the association did not reach statistical significance (p=0.07). This trend is consistent with the well-established association between H. pylori infection and lower socioeconomic status, overcrowding, and inadequate sanitation infrastructure, which remain more prevalent in rural areas of north India and other developing regions.[6,14] The borderline p-value suggests that a larger sample size may be required to confirm this association with adequate statistical power.

No significant association was observed between NUD clinical subtype (PDS versus EPS) and H. pylori status (p=0.44), indicating that the bacterium does not preferentially associate with either symptom-based subtype in this population. This is consistent with the broader understanding that NUD subtypes are defined primarily by symptom pattern related to gastric motility and sensory

dysfunction, mechanisms that are largely independent of H. pylori colonisation status, and aligns with the conclusions of systematic reviews emphasising the multifactorial pathophysiology of NUD.[15]

The strengths of this study include endoscopy-based exclusion of organic disease, biopsy-confirmed

H. pylori status, and systematic recording of sociodemographic variables. Limitations include the single-centre design, modest sample size which may have limited power for the sex and residence comparisons, and the cross-sectional design which

© 2026 IJMSIR, All Rights Reserved

precludes assessment of the duration or chronicity of infection across age groups.

Current Maastricht VI/Florence Consensus and American College of Gastroenterology guidelines recommend testing and treatment of H. pylori in dyspeptic patients after exclusion of alarm features. The observed prevalence of 48% in our cohort supports continued consideration of H. pylori testing among Indian patients presenting with non-ulcer dyspepsia.

Conclusion

H. pylori infection was identified in nearly half of patients with non-ulcer dyspepsia. Age between 31 and 45 years emerged as the strongest predictor of infection, while sex, residence, and dyspepsia subtype were not independently associated with H. pylori positivity. These findings support targeted H. pylori testing strategies in dyspeptic populations and warrant validation through larger multicenter studies.

Limitations

H. pylori diagnosis was based on rapid urease test alone. Histopathology, stool antigen testing, urea breath test, or PCR confirmation was not performed. Therefore, some degree of diagnostic misclassification cannot be excluded.

References

1. Tack J, Talley NJ. Functional dyspepsia — symptoms, definitions and validity of the Rome III criteria. Nat Rev Gastroenterol Hepatol. 2013; 10(3):134–41.
2. Ford AC, Marwaha A, Sood R, Moayyedi P. Global prevalence of, and risk factors for, uninvestigated dyspepsia: a meta-analysis. Gut. 2015;64(7):1049–57.
3. Stanghellini V, Chan FK, Hasler WL, Malagelada JR, Suzuki H, Tack J, et al. Gastroduodenal disorders. Gastroenterology. 2016;150(6):1380–92.
4. Talley NJ, Ford AC. Functional dyspepsia. N Engl J Med. 2015;373(19):1853–63.
5. Gill HH, Desai HG, Majmudar P, Mehta PR, Prabhu SR. Epidemiology of Helicobacter pylori: the Indian scenario. Indian J Gastroenterol. 1993;12(1):9–11.
6. 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;153(2):420–9.
7. Sodhi JS, Javid G, Zargar SA, Shah A, Gulzar GM, Khan BA, et al. Prevalence of Helicobacter pylori infection and the effect of its eradication on symptoms of functional dyspepsia in Kashmir, India. J Gastroenterol Hepatol. 2013;28(5):808–13.
8. Solaiman, Sarkar S, Alam Md, Afreen T. Prevalence of Helicobacter pylori infection among patients of functional dyspepsia in a tertiary level hospital in Bangladesh. Mugda Med Coll J. 2025;8(2):78–83.
9. Subedi RC, Regmi BU, Pathak BD, et al. Prevalence of Helicobacter pylori infection in dyspeptic patients presenting to a tertiary care center of a developing country: a cross-sectional study. F1000Research. 2023;12:1195.
10. Dutta AK, Reddy VD, Iyer VH, Unnikrishnan LS, Chacko A. Exploring current status of Helicobacter pylori infection in different age groups of patients with dyspepsia. Indian J Gastroenterol. 2017; 36(6):509–13.
11. Xia HH, Talley NJ. Natural acquisition and spontaneous elimination of Helicobacter pylori infection: clinical implications. Am J Gastroenterol. 1997;92(10):1780–7.
12. Shi H, Xiong H, Qian W, Lin R. Helicobacter pylori infection progresses proximally associated with pyloric metaplasia in age-dependent tendency: a

© 2026 IJMSIR, All Rights Reserved

cross-sectional study. BMC Gastroenterol. 2018;18:159.

13. Chandrababu D, Nandeesh HP, Suvarna D, Aradya HV, Vijaykumar TR, Indrajit S, et al. Association of H. pylori infection with gastroduodenal disease: a cross sectional study from Mysuru, India. Natl J Med Res. 2016;6(3).
14. Malaty HM. Epidemiology of Helicobacter pylori infection. Best Pract Res Clin Gastroenterol. 2007;21(2):205–14.
15. Du LJ, Chen BR, Kim JJ, Kim S, Shen JH, Dai N. Helicobacter pylori eradication therapy for functional dyspepsia: systematic review and meta-analysis. World J Gastroenterol. 2016;22(12):3486–95.

© 2026 IJMSIR, All Rights Reserved