RESEARCH PAPER

Prevalence And Factors Associated With Helicobacter Pylori In Children Age 5 To 18 Years-Population Based Age Specific Study

Zakirullah[1]*, Sidra Masood[2], Naumana Rehman[3], Zarmast Khan[4], Mubarra Aqeel[5], Karimov Abduhalim Abdurozikovich[6], Hadisaxon Oribjonova Abdumutallib qizi[7]

[1] Pediatrician/SMO, Department of OPD/Pediatrics, Tehsil Headquarter Hospital (THQ), Samarbagh, District Dir Lower, Pakistan.
Email: drzakirullah544@gmail.com
[2] Senior Registrar, Department of Paediatrics, Rai Medical College and Teaching Hospital, Sargodha, Pakistan.
[3] Assistant Professor, Department of Chemical Pathology, KMU-IMS, Kohat, Pakistan.
[4] Professor & HOD, Department of Paediatrics, Niazi Medical & Dental College, Sargodha, Pakistan.
[5] Senior House Officer, Accident and Emergency Department, Shaikh Zayed Hospital, Lahore, Pakistan.
[6] Assistant, Department of Public Health and Health Care Management, Samarkand State Medical University, Samarkand, Uzbekistan.
[7] Assistant, Department of Hospital Therapy, Fergana Public Health Medical Institute, Fergana City, Uzbekistan.

Corresponding Author:
Zakirullah
Pediatrician/SMO, Department of OPD/Pediatrics, Tehsil Headquarter Hospital (THQ), Samarbagh, District Dir Lower, Pakistan.
Email: drzakirullah544@gmail.com..

ABSTRACT

Background: Helicobacter pylori infection is commonly acquired during childhood and may persist into adulthood if untreated. Its prevalence is influenced by age, socioeconomic conditions, sanitation, household crowding, and exposure to infected family members.

Objective: To determine the prevalence of Helicobacter pylori infection and identify associated factors among children aged 5–18 years using an age-specific population-based approach.

Methodology: This population-based cross-sectional study was conducted at Tahsel Headquarter Hospital (THQ) Samerbagh from June 2024 to June 2025 and included 120 children aged 5–18 years. Demographic information including age, gender, weight, height, body mass index (BMI), educational status, residence, parental education, family size, socioeconomic status, source of drinking water, sanitation facilities, hand hygiene practices, history of recurrent abdominal pain, dyspepsia, nausea, vomiting, previous hospitalization, family history of peptic ulcer disease, and exposure to household members with confirmed Helicobacter pylori infection was collected using a structured questionnaire.

Results: The mean age of the participants was 11.6 ± 3.8 years, and 64 (53.3%) were male. Helicobacter pylori infection was detected in 46 (38.3%) children. Prevalence increased significantly from 23.3% in children aged 5–8 years to 33.3% in those aged 9–12 years, 44.8% in those aged 13–15 years, and 56.0% in those aged 16–18 years (p=0.018). Recurrent abdominal pain was reported in 34 (73.9%) infected children, dyspepsia in 28 (60.9%), nausea in 22 (47.8%), poor appetite in 21 (45.7%), and iron-deficiency anemia in 14 (30.4%).

Conclusion: It is concluded that Helicobacter pylori infection is common among children aged 5–18 years and becomes more frequent with increasing age. ......

Keywords: Helicobacter pylori; children; prevalence; age-specific; risk factors; stool antigen test; socioeconomic status...

How to cite this article*:* Zakirullah, Masood S, Rehman N, Khan Z, Aqeel M, Abdurozikovich KA, qizi HOA.., Prevalence And Factors Associated With Helicobacter Pylori In Children Age 5 To 18 Years-Population Based Age Specific Study. Int J Drug Deliv Technol.. 2026;16(79s):440-444. DOI: 10.25258/ijddt.16.79s.47.

Source of support: Nil.

Conflict of interest: Nil.

INTRODUCTION

Helicobacter pylori (H. pylori) is a spiral-shaped, Gram-negative bacterium that colonizes the gastric mucosa and is one of the most common chronic bacterial infections worldwide [1]. Acquisition of the infection usually occurs during childhood, particularly in developing countries where overcrowding, poor sanitation, and low socioeconomic status facilitate transmission [2]. Once established, the infection may persist for decades if left untreated and can contribute to both gastrointestinal and

**Author for Correspondence: drzakirullah544@gmail.com..*

extra-gastrointestinal disorders [3]. Globally, more than half of the world's population is estimated to be infected with H. pylori, although prevalence varies considerably across regions because of differences in living conditions, hygiene practices, he However, access to health care, and socioeconomic development [4] are affected. Infection rates are still much higher in LMICs than in high-income countries [5]. Children in resource-poor environments are especially at risk due to their close contact with others, lack of sanitation, water contamination and poor personal hygiene [6]. In most children who become infected with H. pylori no symptoms will be experienced but chronic gastritis will occur, continuing for a lifetime [7]. H. pylori infection has been linked to ulcerative gastritis and peptic ulcer disease (PUD) in symptomatic children, along with recurrent abdominal pain, dyspepsia, nausea, vomiting, epigastric discomfort, bloating [8]. Persistent infection has also been associated with iron-deficiency anemia, vitamin B12 deficiency, growth retardation and decreased nutritional status, but it is not a consistent finding among different populations [9]. Therefore, early diagnosis of infected children could potentially reduce the occurrence of gastrointestinal problems in the long term and enhance children's well-being [10].

The major mode of transmission of H. pylori is thought to be person-to-person spread through the oral-oral or fecal-oral routes [11]. The childhood acquisition has been attributed to several environmental and household factors, such as overcrowding, using shared utensils, unsafe drinking water, inadequate hand hygiene, low parental education, large family size and exposure to infected household members [12]. Susceptibility to the colonization may also be affected by dietary habits, nutritional deficiencies or repeated gastrointestinal infections [13]. There are invasive and non-invasive means, by which a diagnosis of H. pylori infection in children can be reached. Endoscopic biopsy with histopathology, rapid urease testing and culture are the standard tests in the clinical setting if necessary, while stool antigen testing and urea breath test are good alternatives for epidemiological studies and post treatment follow-up [14]. Depending on the clinical presentation, availability of resources and the goals of the study, the selection of the diagnostic method will vary [15].

Objective

To determine the prevalence of Helicobacter pylori infection and identify associated factors among children aged 5–18 years using an age-specific population-based approach.

Methodology

This population-based cross-sectional study was conducted at Tahsel Headquarter Hospital (THQ) Samerbagh from June 2024 to June 2025 and included 120 children aged 5–18 years. Once Institutional Ethical Review Committee approval and written informed consent were obtained, participants were enrolled by a non-probability consecutive sampling technique. Data on demography (age, gender, weight, height, body mass index (BMI), educational status, place of residence, parental educational level, size of the family, socioeconomic status, source of drinking water, sanitation facilities, hand hygiene, history of recurrent abdominal pain, dyspepsia, nausea, vomiting, previous hospitalization, family history of peptic ulcer disease and exposure to family members with confirmed Helicobacter pylori infection) was gathered with a structured questionnaire. A clinical evaluation and anthropometric assessment was performed on all participants. Stool samples were obtained under standardized conditions and were tested for Helicobacter pylori antigen by a validated enzyme-linked immunosorbent assay (ELISA)-based stool antigen test. Children with clinical suspicion of IDA underwent hemoglobin concentration and serum ferritin levels determination. Stool antigen testing results were used to determine infection status (as positive or negative). The subjects were also divided into age groups: 5 to 8 years, 9 to 12 years, 13 to 15 years and 16 to 18 years to assess the age-specific prevalence. Helicobacter pylori related potential environmental, socioeconomic, nutritional and household risk factors also were recorded. The main outcome was the prevalence of Helicobacter pylori infection among children ages 5-18 years. Secondary outcomes were related to prevalence of H. pylori and demographic, environmental, household, and clinical factors that were associated with its identification, by age.

Statistical Analysis

SPSS version 26.0 was used for data analysis. The continuous variables were presented as mean ± standard deviation and the categorical variables were presented as frequency and percentage. The independent t-test was used to compare continuous variables for infected and non-infected children and the Chi square or Fisher's exact test was used for categorical variables. Those variables with a p value of <0.05 on univariate analysis were subjected to multivariable logistic regression to find independent factors associated with Helicobacter pylori infection. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were computed and p-values of <0.05 were deemed significant.

Results

The study included 120 children with a mean age of 11.6 ± 3.8 years and a mean BMI of 18.7 ± 3.1 kg/m². The largest age group was 9−12 years, comprising 36 (30.0%) children, followed by 30 (25.0%) aged 5−8 years, 29 (24.2%) aged 13−15 years, and 25 (20.8%) aged 16−18 years. There were 64 (53.3%) males and 56 (46.7%) females. 73 (60.8%) participants were in rural areas and 47 (39.2%) were in urban areas. A total of 58 (48.3%) had low SES and 69 (57.5%) had 6 or more members in their family.

Table 1. Demographic and baseline characteristics of the study participants (n=120)

Characteristic	Category	n (%) / Mean ± SD
Age (years)	Mean ± SD	11.6 ± 3.8

Age group	5–8 years	30 (25.0)
	9–12 years	36 (30.0)
	13–15 years	29 (24.2)
	16–18 years	25 (20.8)
Gender	Male	64 (53.3)
	Female	56 (46.7)
BMI (kg/m²)	Mean ± SD	18.7 ± 3.1
Residence	Rural	73 (60.8)
	Urban	47 (39.2)
Socioeconomic status	Low	58 (48.3)
	Middle/High	62 (51.7)
Family size	≥6 members	69 (57.5)
	<6 members	51 (42.5)

Helicobacter pylori infection was detected in 46 (38.3%) children, while 74 (61.7%) tested negative. The prevalence increased progressively with age, from 7 of 30 (23.3%) children aged 5–8 years to 12 of 36 (33.3%) aged 9–12 years, 13 of 29 (44.8%) aged 13–15 years, and 14 of 25 (56.0%) aged 16–18 years. This age-related increase was statistically significant (p=0.018).

Table 2. Prevalence of Helicobacter pylori infection according to age group (n=120)

Variable	Category	n (%)
Overall H. pylori infection	Positive	46 (38.3)
	Negative	74 (61.7)
Age-specific prevalence	5–8 years	7/30 (23.3)
	9–12 years	12/36 (33.3)
	13–15 years	13/29 (44.8)
	16–18 years	14/25 (56.0)
Trend across age groups	Increasing prevalence with age	p=0.018

Among the 46 infected children, recurrent abdominal pain was the most common presentation, affecting 34 (73.9%), followed by dyspepsia in 28 (60.9%), nausea in 22 (47.8%), poor appetite in 21 (45.7%), and epigastric tenderness in 19 (41.3%). Vomiting was reported in 16 (34.8%) children, while 14 (30.4%) had iron-deficiency anemia. Eight (17.4%) infected children were asymptomatic.

Table 3. Clinical manifestations among children with Helicobacter pylori infection (n=46)

Clinical manifestation	n (%)
Recurrent abdominal pain	34 (73.9)
Dyspepsia	28 (60.9)
Nausea	22 (47.8)
Vomiting	16 (34.8)
Epigastric tenderness	19 (41.3)
Poor appetite	21 (45.7)
Iron-deficiency anemia	14 (30.4)
Asymptomatic	8 (17.4)

Children with H. pylori infection were older than uninfected children, with mean ages of 13.2 ± 3.4 and 10.6 ± 3.7 years, respectively (p=0.001). Their mean BMI was slightly lower at 18.1 ± 2.8 kg/m² compared with 19.1 ± 3.2 kg/m², although this difference was not significant (p=0.081). Rural residence was more common among infected children than uninfected children (35 [76.1%] vs. 38 [51.4%]; p=0.007).

Table 4. Comparison of potential risk factors between H. pylori-positive and H. pylori-negative children

Variable	H. pylori Positive (n=46)	H. pylori Negative (n=74)	p-value
Age (years), Mean ± SD	13.2 ± 3.4	10.6 ± 3.7	0.001
BMI (kg/m²), Mean ± SD	18.1 ± 2.8	19.1 ± 3.2	0.081
Rural residence	35 (76.1%)	38 (51.4%)	0.007
Low socioeconomic status	31 (67.4%)	27 (36.5%)	0.001
Family size ≥6 members	34 (73.9%)	35 (47.3%)	0.004
Unsafe drinking water	28 (60.9%)	22 (29.7%)	0.001
Poor hand hygiene	25 (54.3%)	21 (28.4%)	0.005
Household contact with H. pylori	18 (39.1%)	12 (16.2%)	0.004

Unsafe drinking water increased the odds by 2.94 times (95% CI: 1.32–6.57; p=0.008), while age 13 years or older increased the odds by 2.86 times (95% CI: 1.29–6.35; p=0.010). Household contact with H. pylori was associated with 2.63-fold higher odds (95% CI: 1.11–6.23; p=0.028), rural residence with 2.41-fold higher odds (95% CI: 1.08–5.36; p=0.031), family size of six or more members with 2.27-fold higher odds (95% CI: 1.03–5.02; p=0.043), and poor hand hygiene with 2.18-fold higher odds (95% CI: 1.01–4.74; p=0.047).

Table 5. Multivariable logistic regression analysis of factors associated with Helicobacter pylori infection

Variable	Adjusted Odds Ratio (95% CI)	p-value
Age ≥13 years	2.86 (1.29–6.35)	0.010
Rural residence	2.41 (1.08–5.36)	0.031
Low socioeconomic status	3.12 (1.41–6.93)	0.005
Family size ≥6 members	2.27 (1.03–5.02)	0.043

Unsafe drinking water	2.94 (1.32–6.57)	0.008
Poor hand hygiene	2.18 (1.01–4.74)	0.047
Household contact with H. pylori	2.63 (1.11–6.23)	0.028

Discussion

In the present population-based study, the prevalence and the associated factors of the Helicobacter pylori infection were evaluated in 120 children aged 5-18 years. The mean age was 11.6 ± 3.8 years and there was a slight predominance of males (53.3%). The majority of participants were in rural areas (60.8%), 48.3% were in a low socioeconomic group and 57.5% were in a family household consisting of six or more family members. The characteristics are those that could contribute to the transmission of H. pylori from person to person. Childhood infection has also been found to be more prevalent in rural and socio-economically deprived areas where overcrowding, poor sanitation and access to safe water is limited [16]. Overall, the prevalence of H. pylori infection was 38.3%. Importantly, infection was significantly higher with age, with prevalence of 23.3% in children aged 5-8 years, 33.3% in children aged 9-12 years, 44.8% in adolescents aged 13-15 years and 56.0% in adolescents aged 16-18 years (p=0.018). The increasing prevalence with this progressive age increase indicates that the infection is acquired over time and explains why it is generally thought that H. pylori is most commonly acquired in childhood and adolescence. Previous studies also have shown that prevalence was higher in older children and adolescents compared to younger age groups, again with this difference being much larger in the older age groups [17]. Recurrent abdominal pain (73.9%), dyspepsia (60.9%), nausea (47.8%), poor appetite (45.7%) and epigastric tenderness (41.3%) were the most common presentations among infected children. 34.8% experienced vomiting and 30.4% had iron-deficiency anemia. Of particular note, 17.4% of the children with infection were not clinically ill, meaning that they could be infected without being ill. Recurrent abdominal pain and dyspeptic symptoms have also been reported in previous studies as common complaints of infected children, and it has been demonstrated that many children are clinically silent [18].

Several associations between the environment and the child's household were apparent when comparing those infected with those not infected. Infected children were older than their uninfected peers, 13.2 ± 3.4 years vs 10.6 ± 3.7 years (p=0.001). There was a significant association between rural residence, low SE status, large family size, unsafe drinking water, poor hand hygiene, and household contact with an infected person and the positive group. However, there was no significant difference between the two in terms of BMI. Similar findings have been reported previously with strong correlations found between H. pylori infection and overcrowding, unsafe water, low socioeconomic status, poor hygiene, and family members infected, although inconsistent findings have been reported for nutritional measures such as BMI [19]. The presence of low socioeconomic status was the most significant independent associated risk as confirmed by multivariable analysis, which showed a 3.12-fold increase in the risk of infection. Household exposure to unsafe drinking water (2.94 times), age 13 or older (2.86 times), contact with H. pylori (2.63 times), rural residence (2.41 times), family size 6+ (2.27 times), poor hand hygiene (2.18 times) were each associated with an increased risk. Previous studies have shown similar results and highlighted the importance of household crowding, fecal-oral transmission, contaminated water, and prolonged contacts with infected family members among children as risk factors for H. pylori infection [20]. Another clinically important association is H. pylori infection and iron-deficiency anemia in 30.4% of children infected with H. pylori. Chronic gastric inflammation could lead to decreased absorption of iron, changes in gastric acidity, and recurrent or chronic iron deficiency. Previous studies have also indicated that H. pylori infection may be a factor in unexplained or treatment-resistant iron-deficiency anemia in children, but the association differs in various populations. The cross-sectional design of this study was a limitation, as it prevented causal inferences between factors identified and H. pylori infection. The sample size of the one study population used may reduce the generalizability of the findings. Furthermore, there was no long-term follow up or outcomes of post-eradication.

Conclusion

It is concluded that Helicobacter pylori infection is common among children aged 5–18 years and its prevalence increases with age. Low socioeconomic status, unsafe drinking water, rural residence, large family size, poor hand hygiene, and household exposure to infected individuals were significant factors associated with infection. Early identification of high-risk children, along with improvements in sanitation, hygiene practices, and access to safe drinking water, may help reduce the burden of Helicobacter pylori infection and its associated gastrointestinal complications.

..

REFERENCE

1. Meng-Che, W., Leong, P. Y., Chiou, J. Y., Huang-Hsi, C., Jing-Yang, H., & Wei, J. C. C. (2020). Increased risk of systemic lupus erythematosus in patients with Helicobacter pylori infection: a nationwide population-based cohort study. Frontiers in medicine, 6, 493156.
2. Meyer, S. R., Meyer, E., Bangirana, C., Simeoni, S., Frova, L., & De Curtis, M. Year of.
3. Haahtela, T., Alenius, H., Auvinen, P., Fyhrquist, N., von Hertzen, L., Jousilahti, P., ... & Mäkelä, M. J. (2023). A short history from Karelia study to biodiversity and public health interventions. Frontiers in allergy, 4, 1152927.

4. Fares, L. A. N. A. (2023). Determinants of Infectious Diseases among Pediatric Admissions in Palestine Medical Complex: A Case-Control Study (Doctoral dissertation, Al-Quds University).

5. Etemadi, A., Safiri, S., Sepanlou, S. G., Ikuta, K., Bisignano, C., Shakeri, R., ... & Sekerija, M. (2020). The global, regional, and national burden of stomach cancer in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease study 2017. The lancet Gastroenterology & hepatology, 5(1), 42-54.

6. Jiang, D., Zhang, L., Liu, W., Ding, Y., Yin, J., Ren, R., ... & Cao, G. (2021). Trends in cancer mortality in China from 2004 to 2018: A nationwide longitudinal study. Cancer Communications, 41(10), 1024-1036.

7. Chen, T., Yang, Y., Qiu, D., & Xuan, F. (2026). Temporal Trends in Cancer Burden and 27 Subtypes Among Women of Childbearing Age Globally from 1990 to 2021. International Journal of Women's Health, 622223.

8. Shi, J. F., Cao, M., Wang, Y., Bai, F. Z., Lei, L., Peng, J., ... & Chen, W. (2021). Is it possible to halve the incidence of liver cancer in China by 2050?. International journal of cancer, 148(5), 1051-1065.

9. Hibino, M., Hamashima, C., Iwata, M., & Terasawa, T. (2023). Radiographic and endoscopic screening to reduce gastric cancer mortality: a systematic review and meta-analysis. The Lancet Regional Health–Western Pacific, 35.

10. AREATA, A. (2024). Medical Faculty Department of Dermatology and Venereology (Doctoral dissertation, Medical University-Plovdiv).

11. Visaggi, P., & Dellon, E. S. (2026). REVIEWS IN BASIC AND CLINICAL GASTROENTEROLOGY AND HEPATOLOGY. Gastroenterology, 170, 476-494.

12. Kim, J. H., Han, H. W., Song, J. H., Kim, S. J., Kim, Y. K., Kim, H. J., ... & Shim, S. R. (2025). Increased risk of colorectal adenoma and benign colorectal polyp associated with Helicobacter pylori infection: a systematic review and meta-analysis. Translational Cancer Research, 14(4), 2354-2366.

13. Tari, H., Harri, A., Petri, A., Nanna, F., Pekka, J., Piia, K., ... & Erkki, V. (2023). A short history from Karelia study to biodiversity and public health interventions.

14. Al-Beltagi, M., Saeed, N. K., Bediwy, A. S., El-Sawaf, Y., Elbatarny, A., & Elbeltagi, R. (2025). Exploring the gut-exercise link: A systematic review of gastrointestinal disorders in physical activity. World journal of gastroenterology, 31(22), 106835.

15. Yadav, R. S., Bargujar, P., Pahadiya, H. R., Yadav, R. K., Upadhyay, J., Gupta, A., & Lakhotia, M. (2021). Acute upper gastrointestinal bleeding in hexagenerians or older (≥ 60 years) versus younger (< 60 years) patients: clinico-endoscopic profile and outcome. Cureus, 13(2), e13521.

16. Lin, J., Wang, H., Lin, H., & Xu, C. (2026). Multi-strategy feature selection and multi-model machine learning for prognostic prediction in primary gastric diffuse large B-cell lymphoma. Digital Health, 12, 20552076261450466.

17. Meeta, M., Digumarti, L., Agarwal, N., Vaze, N., Shah, R., & Malik, S. (2020). Clinical practice guidelines on menopause:* An executive summary and recommendations: Indian Menopause Society 2019–2020. Journal of mid-life health, 11(2), 55-95.

18. Li, Y., Tang, M., Li, S., Li, Z., Chen, Z., Tang, J., ... & Shen, W. (2025). Global, regional, and national burden of gastrointestinal cancers in early onset and young women, 1990–2021: analysis of data from the Global Burden of Disease study 2021. Journal of Gastrointestinal Oncology, 16(5), 1924-1943.

19. Fowler, K., Mucha, J., Neumann, M., Lewandowski, W., Kaczanowska, M., Grys, M., ... & Diaz-Decaro, J. (2022). A systematic literature review of the global seroprevalence of cytomegalovirus: possible implications for treatment, screening, and vaccine development. BMC Public Health, 22(1), 1659.

20. Westerik, C. H. (2020). Locally produced probiotic yoghurt for better nutrition and increased incomes in Uganda.

. .