Original Article

Frequency of Helicobacter Pylori Infection in Children presented with Abdominal Pain in a Tertiary Care Hospital

Helicobacter Pylori Infection in Children

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ABSTRACT

Objective: This study aimed to determine the frequency of H.pylori infection in children presenting with abdominal pain at tertiary care hospital in Pakistan.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Pediatrics, Abbas Institute of Medical Sciences Muzaffarabad Azad Jammu & Kashmir from January 2025 to June 2025.

Methods: This cross-sectional study was conducted among 317 children aged 5-15years who presented with abdominal pain at the pediatric outpatient department of the hospital. Data were collected using a structured questionnaire addressing demographic characteristics, socioeconomic background and potential risk factors. H.pylori infection was diagnosed using stool antigen test. Data was analyzed using SPSS 23.0 version and associations between risk factors and infection were assessed using chi-square tests, with a *p*-value <0.05 considered significant.

Results: Out of 317 participants 176 (55.5%) were males and 141(44.5%) were females with mean age of 9.8±3.1years. The overall frequency of H-pylori was 84 (26.5%). The infection was most common in the 11-15 year age group. A higher frequency was observed in low socioeconomic status(47.6%), those using tap water sources (32.5%), living in overcrowded conditions (31.6%) and practicing poor hygiene (34.5%) with statistically significant associations (p <0.05). No significant difference was found in genders (p>0.05).

Conclusion: This study concluded that H.pylori infection is highly prevalent among children with abdominal pain and is significantly associated with poor hygiene practices, overcrowding, unsafe drinking water and low socioeconomic status.

Key Words: Helicobacter pylori, Abdominal pain, Risk factor, Children, Stool antigen test.

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INTRODUCTION

Helicobacter pylori (H.pylori)is a gram negative rods bacterium that colonizes the gastric mucosa in the stomach triggering inflammation and mucosal damage. It has been reported as one of the cause of gastritis in children.[1] Although the infection most often arises in children the natural history, clinical presentation and implications of pediatric H-pylori infection differ from adults in important ways.[2]

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Globally the prevalence estimate for H-pylori in children vary depending on region, socioeconomic status, diagnostic methods and study population. The systematic review and large meta-analysis report revealed that the prevalence in pediatrics is approximately 20-35% worldwide but the rates are higher in low and middle income countries. The prevalence in these countries ranges from 50-70% and depending on age cohort and detection method. The most accurate diagnostic test to measure the activeness of infection are stool antigen and urea breathe test while serology tends to overestimate the current infection.[3,4]

The most common presentation of H-pylori infection in children are recurrent abdominal pain and dyspeptic symptoms although there is controversy in the strength and consistency and it remains debatable. Several studies on children from developing countries have reported a large proportion of positive H-pylori infection among children with recurrent or chronic abdominal pain compared to the controls which suggest that H-pylori may contribute to symptom burden in a subset of patients.[5] The public health and clinical significance of infection of H-pylori in children extends

beyond its potential role in causing abdominal pain. A meta-analysis revealed an association between infection of H-pylori and higher likelihood of iron deficiency anemia and randomized controlled trial revealed that eradication of H-pylori may improve iron parameters in some patients.[6,7] The risk factors in these patients reflect complex interactions among environmental, socioeconomic and familial determinants. Lower household income, overcrowding, lack of clean water, poor sanitation and high family density are associated with childhood acquirement. In lower middle income countries early age acquisition is common which results in higher prevalence in school-age children compared to children in high income settings.[4]

Accurate diagnosis of H-pylori requires attention to test performance features and to international guidelines recommendations. Recent studies from gastroenterology societies suggest that noninvasive tests i.e., urea breathe test and stool antigen testing, that detect active infection are preferred for diagnosing active infection in children with relevant indications. However, endoscopic biopsies should be reserved for those infections with alarming features or when endoscopy is clinically indicated. Furthermore, the increase prevalence of antibiotic resistance, the most recent guidelines advise that antimicrobial susceptibility testing (cultural or molecular methods applied to biopsy specimens) should guide eradication therapy whenever feasible. The above recommendations highlight the diagnostic complexities and need for local laboratory capacity when planning clinical management pathways for these children.[6,8]

The therapeutic strategies for pediatric H-pylori have evolved in response to resistance patterns and evidence regarding efficacy. Standard triple therapy regimens (amoxicillin, clarithromycin and a proton pump inhibitor) are the backbone for pediatric H-pylori eradication but clarithromycin resistance in many regions has decreases the empirical cure rates. Therefore, the therapeutic protocol for pediatric H-pylori depends on emphasizing on local resistance data or susceptibility tests. In addition, the decision to test and treat children is nuanced: blanket "test=and-treat" strategies for abdominal pain are not universally endorsed in children. Thus prevalence data from symptomatic pediatric populations are essential to guide rational testing policies at tertiary care centers.[9,10]

Several studies have assessed H-pylori association with abdominal pain in children. A study from Egypt where 100 children with recurrent abdominal pain were evaluated and did not found a strong relation of H-pylori with recurrent abdominal pain even though infection was present, after excluding other possible etiologies (parasite, helminthes etc.).[11] This suggest heterogeneity in presentations that H-pylori may not universally explain abdominal pain in children. Various local studies in Pakistan have revealed a higher frequency of H-pylori infection among children with abdominal pain. A cross-sectional study conducted in Multan on 148 children with age range from 4-12 years, 52.7% having recurrent abdominal pain were tested positive for infection of H-pylori through stool antigen test.[5] In another study at Nishtar Hospital, Multan among 185 children with recurrent abdominal pain (duration> 3months), 55.7% were having infection of H-pylori.[12] Another study using stool antigen test among 100 children aged 2-12 years with recurrent abdominal pain,38% children have H-pylori infection.[13] The frequency in Peshawar appears lower. In this study the detected prevalence was 24.9% in a total of 177 children presented with recurrent abdominal pain.[14]

These inconsistencies largely due to differences in diagnostic methods, study design and population characteristics. These differences highlight a major research gap in determining the true burden of active H-pylori infection among symptomatic pediatric patients. Moreover, limited data exist on demographic and environmental risk factors in the local context. Therefore, this study justified to generate evidence based, region specific data on the frequency of H-pylori infection among children presenting with abdominal pain in tertiary care hospital in Pakistan. The findings of this study will address current knowledge gaps, standardize local diagnostic approaches and contribute to improved clinical management and prevention strategies in pediatric gastroenterology.

The objective of this study was to determine the frequency of H-pylori infection among children presenting with abdominal pain in a tertiary care hospital.

METHODS

A descriptive cross-sectional study was carried out in the Department of Pediatrics, Abbas Institute of Medical Sciences Muzaffarabad Azad Jammu & Kashmir from January 2025 to June 2025.

Sample Size Calculation: A total of 317 sample size were selected (adding 10% to account for incomplete data or potential non-response). Using the World Health Organization (WHO) formula for a single population proportion the sample size was calculated;

$n = (Z^2 \times p(1 - p)) / d^2$

Inclusion Criteria

1. Children aged 5–15 years of either gender.
2. Patients presenting with abdominal pain of more than two weeks' duration.
3. Informed consent provided by children's parents/guardians.

Exclusion Criteria

1. Those who had received antibiotic therapy, proton pump inhibitors (PPIs), or bismuth compounds within the last four weeks.

2. Patients with known chronic gastrointestinal diseases such as celiac disease, inflammatory bowel disease, or chronic liver disease.
3. Children with systemic illnesses or immunocompromised states.

Data Collection Procedure: Ethical approval was obtained from the Institutional Review Board (IRB) and informed consent from parents/guardians was taken, data were collected using a structured questionnaire and clinical data form.

Each child underwent a detailed clinical examination, and relevant laboratory investigations were performed to confirm H. pylori infection. Children who tested positive for H. pylori infection were referred for appropriate medical treatment as per institutional protocols.

Diagnostic Method: H. pylori infection was diagnosed using the stool antigen test (HpSA), which is a non-invasive, reliable, and sensitive method suitable for pediatric populations. Stool samples were collected in sterile containers and tested using a commercially available enzyme immunoassay (EIA) kit.

Operational Definitions

- **Abdominal Pain:** Persistent or recurrent discomfort localized in the abdominal region lasting for two weeks or more, reported by the child or guardian.
- **Helicobacter pylori Infection:** Presence of H. pylori antigen detected in the stool sample using the enzyme immunoassay test, indicating current infection.
- **Socioeconomic Status:** Categorized based on monthly household income (low < PKR 50,000; middle 50,000–150,000; high > 150,000).
- **Overcrowding:** Defined as ≥3 persons per bedroom within the household.
- **Unsafe Water Source:** Consumption of tap or well water without boiling or filtration.
- **Poor Hygiene Practices:** Infrequent handwashing before meals or after defecation, and sharing of utensils among family members.
- **NSAID Use:** Regularly use within the last month.
- **Parental Education Level:** The highest educational qualification of either parent categorized as uneducated, primary, secondary, or higher.

All data was analyzed using SPSS version 23.0. Frequencies and percentages were used for categorical variables. Continuous variables were expressed as mean ± standard deviation (SD). The frequency of H. pylori infection was determined as the percentage of positive stool antigen tests among the total study population. Chi-square test was used for associations between H. pylori infection and risk factors. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 317 children aged 5-15 years presenting with abdominal pain were included in this study. Among them, 176 (55.5%) were males and 141(44.5%) were females resulting male to female ratio of approximately 1.2:1 as shown in figure 1. The mean age of participants was 9.8±3.1years. The majority of children 194(61.2%) were belonged to 5-10years age group, while 123 (38.8%) were aged between 11-15 years. In terms of socioeconomic status, 151(47.6%) of children were from low-income families, 120(37.9%) from middle-income families and 46 (14.5%) from high-income families.

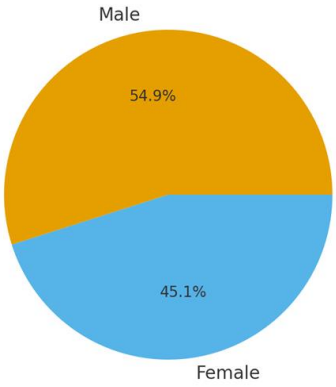

Figure No. 1: Gender Distribution.

Table No. 1: H-pylori infection by age and gender.

Variable	Category	Table(n)	Positive(n)	Percentage (%)	p-value
Gender	Male	176	49	27.8	0.48
	Female	141	35	24.8	
Age Group (years)	5-10	194	48	24.7	0.31
	11-15	123	36	29.2	

Table No. 2: Association of H-pylori infection with Risk Factors.

Risk Factors	Category	Total (n)	H-pylori positive (n)	% Positive	p-value
Socioeconimc Status	Low	151	50	33.1	**0.01**
	Middle	120	26	21.7	
	High	46	8	15.2	
Water Source	Tap	169	56	32.5	**0.004**
	Filtered	78	12	15.4	
	Bottled	33	5	12.1	
	well	37	11	29.7	

Overcrowding	Present	190	60	31.6	**0.02**
	Absent	127	24	18.9	
Poor Hygiene	Yes	174	60	34.5	**0.01**
	No	143	24	16.8	
Parental Education (Low)	Yes	143	47	32.9	**0.03**
	No	174	37	21.3	
NSAID Use	Yes	61	20	23.8	0.07
	No	256	64	15.0	
Family History of Gastritis/Ulcer	Yes	72	23	31.9	0.09
	No	245	61	24.9	

Out of total 317 participants, 84 (26.5%) were found to be positive for H-pylori infection based on stool antigen testing. The remaining 233(73.5%) tested negative. The infections were more prevalent amongst males 27.8% compared to female 24.8% though this difference was not statistically significant (p=0.48). Infection rates were slightly higher among older children (29.2% in 11-15 years) than younger (24.7% in 5-10 years) but the difference was also not significant (p=0.31) as shown in table 1.

A significant high prevalence of H-pylori infection was observed among children belonging to low socioeconomic status (33.1%) compared to middle (21.7%) and high (15.2%) income groups (p=0.01). Children consuming tap water 32.5% and well water 29.7% showed a significant higher infection rates than those using filtered 15.4% or bottled water 12.1% (p=0.004).

Similarly infection was more common among children from overcrowded households 31.6%, those with poor hygiene practices 34.5 % and parents with low education 32.9% compared their respective counterparts (p< 0.05). Use of NSAIDs and family history of gastritis or peptic ulcer disease were also associated with higher infection rates but the association was not significant (p=0.07 and 0.09 respectively). Table 2 summarize the distribution of H-pylori infection with respect to potential risk.

DISCUSSION

The present study aimed to determine the frequency of H-pylori infection in children presenting with abdominal pain in a tertiary care hospital in Pakistan. The findings revealed that a considerable proportion of pediatric patients had evidence of H-pylori infection, aligning with global and regional data that highlight the bacterium's high prevalence in developing countries. The observed infection rate of 26.5% corresponds closely with studies conducted in other South Asian populations, emphasizing similar environmental and socioeconomic factors influencing disease burden.

Comparing our findings with regional studies, Punhal et al[15] in Quetta reported a 32.5% prevalence among symptomatic children, Mahmud et al[13] revealed 38% in Rawalpindi, Afridi et al[14] observed 24.9% in Peshawar while Memon et al[16] documented 31% in Karachi. These findings are consistent with our results, suggesting a similar epidemiological pattern across various provinces of Pakistan. However, in a study by Khurshid et al[12] reported 55.7% cases, Ali Muhammadi et al[17] observed 58% cases of H-pylori in children with recurrent abdominal pain, Nadeem et al[18] reported 62% infection in children with H-pylori while Zeyrek et al[20] noted 49% from Turkey. These variations in literature could be due to the diagnostic tools, differences in sanitation and hygiene practices.

The current study revealed 55.5% males and 44.5% females. A Turkish study[19] reported 53% of male dominancy with recurrent abdominal pain. A study by Mahmud et al[14] 58% male gender while Khurshid et al[12] also revealed 54.6% males compared to females 45.6%. These studies are in consistent with this study. Alimohammadi et al[12] documented higher female predominance than male which opposes this study. The reason behind this trend remains unclear but may be related to behavioral or environmental exposure differences between genders.

The mean age presentation in this study was 9.8±3.1years. The mean age by Afridi et al[14] from Peshawar revealed 11.29 ± 2.74 years, khurshid et al[12] 7.57±1.93 years and Zeyrek[19] from Turkey found the mean age of 9 years. These studies are in comparable with this study. Therefore, early identification and treatment of infected children can have long-term benefits in reducing gastrointestinal morbidity in adulthood.

The current study also evaluated potential risk factors associated with H-pylori infection. A significant association was observed between H-pylori positivity and Low socioeconomic status, unsafe drinking water, overcrowded living conditions, poor hygiene and parental education. These findings align with previous literature suggesting that H-pylori transmission is predominantly fecal-oral or oral-oral, and thus closely related to hygiene and socioeconomic factors.[20] Sardar et al[21] highlighted that inadequate sanitation and contaminated drinking water were the strongest predictors of infection among children.

The strength of this is its focus on children presenting with abdominal pain in a tertiary care hospital, providing reliable local data on H-pylori infection in

Pakistan. It used laboratory-based confirmation of infection, minimizing diagnostic errors and included the key risk factors such as socioeconomic status, hygiene and water source for comprehensive analysis. The use of standardized methodology and an adequately calculated sample size enhanced the study's validity and allowed meaningful comparison with other regional and international studies.

The implications of these findings are significant for clinical practice and public health. Given that H-pylori infection is often asymptomatic but can contribute to long-term gastrointestinal disorders, routine screening of children with recurrent or unexplained abdominal pain may be warranted in endemic areas. Moreover, preventive strategies focusing on sanitation improvement, safe water supply, and public education are essential to curb transmission. Policymakers and healthcare providers must collaborate to ensure early detection, effective treatment, and preventive health education.

Limitations of the Study: The limitations of this study include its cross-sectional design, which limits causal inference, and the fact that it was conducted at a single tertiary care center, potentially affecting generalizability. Additionally, some risk factors were self-reported, which might introduce recall bias. Future studies involving larger, multicenter cohorts and incorporating molecular diagnostic methods could provide more comprehensive insights into transmission dynamics and bacterial virulence patterns in Pakistani children.

CONCLUSION

The findings of this study concluded that a significant high frequency of H-pylori among children presenting with recurrent abdominal pain. The infection was strongly associated with low socioeconomic status, poor hygiene practices, unsafe drinking water and overcrowded living conditions.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Aalya Farooq, Manzoor Ali Khan, Gulraiz Iqbal
Drafting or Revising Critically:	Sughra Latif, Qurba Batool, Tanveer Hussain
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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