Annual Methodological Archive Research Review
http://amresearchreview.com/index.php/Journal/about
Volume 3, Issue 12 (2025)

Online ISSN 3007-3197
Print ISSN 3007-3189

http://amresearchreview.com/index.php/Journal/about

Prevalence and Sociodemographic Correlates of Helicobacter pylori Infection in Tehsil Mandanr, District Buner, Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Background: Helicobacter pylori is a major gastric pathogen associated with chronic gastritis, peptic ulcers, and gastric cancer. Its prevalence varies globally, with higher rates in developing regions. This study aimed to determine the prevalence and associated sociodemographic risk factors of H. pylori infection in Tehsil Mandanr, District Buner, Khyber Pakhtunkhwa, Pakistan.

Methods: A cross-sectional study was conducted from July to August 2025, involving 256 participants selected through simple random sampling. Data were collected using structured questionnaires and diagnostic tests. Descriptive statistics were used to analyze sociodemographic variables and infection rates.

Results: The overall prevalence of H. pylori infection was 64% (163/256). Infection rates were higher in males (80%) compared to females (20%). The most affected age group was 21–40 years (66%), followed by 5–20 years (19%) and >40 years (15%). Higher infection rates were observed among individuals with high school education (37.4%), students (25.8%), and those with monthly incomes between PKR 31,000–50,000 (42.9%).

Conclusion: H. pylori infection is highly prevalent in Tehsil Mandanr, with significant associations with male gender, younger age, lower education, and middle-income status. Public health interventions targeting awareness, hygiene, and socioeconomic conditions are recommended.

Keywords: Helicobacter Pylori, Prevalence, Sociodemographic Factors, Buner, Pakistan, Cross-Sectional Study.

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Introduction

Helicobacter pylori is a Gram-negative, spiral-shaped bacterium that colonizes the human gastric mucosa and is a major etiological agent of chronic gastritis, peptic ulcers, gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma (Wan et al., 2025). Classified as a Group I carcinogen by the World Health Organization, H. pylori is recognized as the most prevalent bacterial infection in humans, affecting approximately 50% of the global population (Hooi et al., 2017). Infection rates vary significantly by region, with higher prevalence observed in developing countries due to factors such as overcrowding, poor sanitation, low socioeconomic status, and limited access to clean water (Salih, 2009).

In Pakistan, the burden of H. pylori infection is substantial, with prevalence estimates ranging from 58% to over 68% in various regions (Fatima et al., 2023; Haq et al., 2020). Socioeconomic determinants, including education level, income, household size, and hygiene practices, have been strongly linked to infection risk (Rasheed et al., 2012; Shah et al., 2021). Despite its high prevalence, awareness of H. pylori and its associated health risks remains limited in many rural and semi-urban communities.

Tehsil Mandanr in District Buner, Khyber Pakhtunkhwa, represents an understudied region with limited data on H. pylori epidemiology. Previous studies in neighboring districts such as Mardan and Peshawar have reported high infection rates, particularly among young adults and males (Hussain et al., 2023; Fatima et al., 2023). However, no focused study has been conducted in Tehsil Mandanr to assess the local prevalence and sociodemographic correlates of H. pylori infection.

Therefore, this study aimed to determine the prevalence of H. pylori infection and identify associated sociodemographic factors among residents of Tehsil Mandanr, District Buner, Khyber Pakhtunkhwa, Pakistan. The findings are intended to inform public health interventions and contribute to regional epidemiological data on H. pylori infection.

Materials and Methods

Study Design and Setting

A community-based cross-sectional study was conducted from July to August 2025 in Tehsil Mandanr, District Buner, Khyber Pakhtunkhwa, Pakistan. The district is situated in the Malakand Division with a population of approximately 1,016,869 (Akhtar et al., 2016).

Participants and Sampling

A total of 256 participants were selected using simple random sampling from rural and semi-urban areas. Participants included both symptomatic individuals visiting healthcare facilities and asymptomatic community members.

Data Collection

Data were collected through face-to-face interviews using a structured questionnaire covering sociodemographic details, lifestyle factors, medical history, and hygiene practices. Diagnostic confirmation of H. pylori infection was performed using stool antigen tests, urea breath tests, or serological methods.

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Ethical Considerations

Informed consent was obtained from all participants. The study was conducted in accordance with ethical guidelines approved by local health authorities. Confidentiality was maintained throughout the study.

Data Analysis

Data were analyzed using Microsoft Excel 2016. Descriptive statistics, including frequencies and percentages, were used to summarize the data. Results are presented in tables and figures.

Results

Overall Prevalence

Out of 256 participants, 163 (64%) tested positive for H. pylori, while 93 (36%) were negative.

Table 1: Overall prevalence of H. pylori infection

Total Cases	Positive Cases	Positive %	Negative Cases	Negative %
256	163	64%	93	36%

Gender-wise Prevalence

Males constituted 80% (130/163) of positive cases, compared to 20% (33/163) females.

Table 2: Gender-wise prevalence

Gender	Total Sample	Positive Cases	Percentage
Male	214	130	80%
Female	42	33	20%

Age-wise Prevalence

The highest prevalence was in the 21–40 age group (66%), followed by 5–20 years (19%) and >40 years (15%).

Table 3: Age-wise prevalence

Age Group (years)	Total Sample	Positive Cases	Percentage
5-20	60	31	19%
21-40	160	108	66%

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Age Group (years)	Total Sample	Positive Cases	Percentage
>40	36	24	15%

Education-level-wise Prevalence
High school-educated individuals had the highest infection rate (37.4%).

Table 4: Education-level prevalence

Education Level	Total Sample	Positive Cases	Percentage
Illiterate	38	31	19%
Primary	32	22	13.5%
Middle	20	14	8.6%
High School	100	61	37.4%
Undergraduate	29	14	8.6%
Graduate	37	21	12.9%

Occupation-wise Prevalence
Students (25.8%), laborers (19%), and housewives/farmers (16.6%) were most affected.

Table 5: Occupation-wise prevalence

Occupation	Total Sample	Positive Cases	Percentage
Students	84	42	25.8%
Laborers	46	31	19%
Housewives	27	27	16.6%
Farmers	41	27	16.6%
Shopkeepers	29	17	10.4%
Teachers	23	13	8%

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Occupation	Total Sample	Positive Cases	Percentage
Servants	6	6	3.7%

Income-wise Prevalence

The majority of positive cases were in the PKR 31,000–50,000 monthly income group (42.9%).

Table 6: Income-wise prevalence

Monthly Income (PKR)	Total Sample	Positive Cases	Percentage
10,000-30,000	92	61	37.4%
31,000-50,000	98	70	42.9%
51,000-80,000	41	25	15.3%
>80,000	25	7	4.3%

Discussion

The high prevalence (64%) of H. pylori infection in Tehsil Mandanr aligns with previous studies from Pakistan and other developing regions. The predominance in males may reflect occupational exposure, dietary habits, or healthcare-seeking behavior. The higher infection rate in the 21–40 age group suggests active transmission among young adults, possibly due to lifestyle factors such as eating outside the home and poor hygiene. Lower education and middle-income status were also associated with higher infection rates, consistent with global patterns linking H. pylori to socioeconomic determinants (Hooi et al., 2017; Salih, 2009).

Our findings corroborate studies from neighboring districts where H. pylori prevalence exceeded 58% (Fatima et al., 2023; Hussain et al., 2023). The association with lower education levels and middle-income brackets underscores the need for targeted health education and socioeconomic interventions.

These findings underscore the need for targeted public health strategies, including health education, improved sanitation, and accessible diagnostic and treatment services. Community-based awareness programs focusing on hygiene, safe water consumption, and early diagnosis could significantly reduce the infection burden.

Conclusion

H. pylori infection is highly endemic in Tehsil Mandanr, District Buner, with significant sociodemographic disparities. Interventions focusing on awareness,

Online ISSN 3007-3197
Print ISSN 3007-3189

hygiene promotion, and socioeconomic development are essential to reduce the burden of infection and associated gastric diseases. Further longitudinal studies are recommended to monitor trends and evaluate intervention effectiveness.

Acknowledgments

The authors thank the participants, healthcare workers, and local authorities in Tehsil Mandanr for their cooperation and support. We also acknowledge the diagnostic centers and hospitals that facilitated sample collection and testing.

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