



Original Article

“Community Awareness of *Helicobacter pylori* and Intestinal Parasitic Infections and Their Association with Iron Deficiency Anemia: A Cross-Sectional Study”

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Abstract

Background: Iron deficiency anemia is a prevalent public health problem, particularly in low- and middle-income countries. Chronic gastrointestinal infections, including *Helicobacter pylori* and intestinal parasitic infections, may contribute to iron deficiency through impaired absorption and chronic inflammation. **Objective:** To assess community awareness of *Helicobacter pylori* and intestinal parasitic infections and their perceived association with iron deficiency anemia. **Methods:** A descriptive cross-sectional study was conducted among 150 adults using a structured, self-administered questionnaire. Data included sociodemographic characteristics, knowledge of gastrointestinal infections, and history of iron deficiency. Statistical analysis was performed using SPSS, with significance set at $p < 0.05$. **Results:** Awareness of *H. pylori* and intestinal parasitic infections was reported by 67.3% and 65.3% of participants, respectively. A history of anemia was reported by 39.3%. Significant associations were found between anemia history and awareness of *H. pylori* ($p = 0.003$) and intestinal parasites ($p = 0.018$). **Conclusion:** Community awareness of infection-related iron deficiency anemia was moderate. Strengthening public education and screening programs may help reduce the burden of iron deficiency anemia.

Keywords: Iron deficiency anemia; *Helicobacter pylori*; Intestinal parasites; Awareness; Cross-sectional study.

Introduction

reduced gastric acid secretion, and bacterial utilization of host iron stores [2].

Intestinal parasitic infections also represent a major public health concern, especially in regions with inadequate hygiene and sanitation. These infections are commonly transmitted through contaminated food, water, or soil and disproportionately affect populations in resource-limited settings. Several intestinal parasites, including hookworms and protozoa, are known to contribute to iron deficiency through chronic blood loss, intestinal inflammation, and impaired nutrient absorption. The coexistence of intestinal parasites with other infections may further exacerbate nutritional deficiencies, particularly iron deficiency and anemia [3]. Recent studies have highlighted a potential synergistic effect between *H. pylori* infection and intestinal parasitic infestations in the development of iron deficiency and iron deficiency anemia. Individuals infected with both conditions may be at a higher risk of depleted iron stores compared to those with a single infection. However, public awareness regarding these associations remains limited, and misconceptions about transmission routes, symptoms, and long-term consequences are common. Assessing community knowledge and awareness is therefore essential to guide effective prevention strategies and health education programs [4].

Iron deficiency and iron deficiency anemia remain among the most prevalent nutritional disorders worldwide, affecting both developed and developing countries and imposing a significant burden on public health systems. Iron is essential for oxygen transport, cellular metabolism, and immune function, and its deficiency can lead to fatigue, impaired cognitive performance, reduced work capacity, and increased susceptibility to infections. Despite advances in nutrition and healthcare, iron deficiency continues to be highly prevalent due to multifactorial causes, including inadequate dietary intake, malabsorption, chronic infections, and parasitic diseases [1].

Helicobacter pylori infection is one of the most common chronic bacterial infections globally, colonizing the gastric mucosa of nearly half of the world's population. The prevalence of *H. pylori* is particularly high in low- and middle-income countries, where overcrowding, poor sanitation, and limited access to clean water are common. Chronic *H. pylori* infection has been strongly associated with gastritis, peptic ulcer disease, and gastric malignancies. In addition to its gastrointestinal effects, growing evidence suggests that *H. pylori* infection may interfere with iron absorption and metabolism through mechanisms such as chronic gastric inflammation,



immunity, chronic fatigue, and the importance of screening for *H. pylori* and intestinal parasites.

The questionnaire was developed based on an extensive review of relevant literature. Content validity was assessed by a panel of experts in microbiology, public health, and clinical research. Minor modifications were made based on their feedback to ensure clarity and relevance.

A pilot study was conducted on 15 participants to evaluate clarity and consistency. Reliability was assessed using Cronbach's alpha coefficient, which demonstrated acceptable internal consistency ($\alpha \geq 0.7$).

Data Collection Procedure

Participants were informed about the purpose of the study, and verbal consent was obtained prior to questionnaire distribution. Confidentiality and anonymity were ensured throughout the data collection process. Questionnaires were completed voluntarily without any identifying personal information.

Ethical Considerations

Ethical approval was obtained from the relevant institutional authority prior to conducting the study. Participation was entirely voluntary, and participants were informed of their right to withdraw at any stage without any consequences. All collected data were used solely for research purposes.

Statistical Analysis

Data were entered and analyzed using SPSS software (version XX). Descriptive statistics, including frequencies and percentages, were used to summarize participants' characteristics and awareness levels.

The Chi-square test was applied to assess the association between categorical variables, such as awareness of infections and history of anemia.

Additionally, binary logistic regression analysis was performed to identify independent predictors of anemia, including awareness of *Helicobacter pylori* and intestinal parasitic infections, while controlling for potential confounding variables such as age, gender, and education level. A p-value of less than 0.05 was considered statistically significant.

Limitation Of Study

This study has several limitations that should be considered. First, the cross-sectional design limits the ability to establish causal relationships between infections and iron deficiency anemia.

Second, the study relied on self-reported data for anemia history, which may be subject to recall bias and misclassification.

Third, the use of convenience sampling may limit the generalizability of the findings to the broader population. Additionally, laboratory confirmation of *Helicobacter pylori* infection, intestinal parasitic infections, and iron status (e.g., ferritin, hemoglobin levels) was not performed, which limits the ability to draw definitive clinical conclusions.

This study aims to assess the level of awareness among the adult population regarding *H. pylori* infection and intestinal parasitic infections and to evaluate their perceived association with iron deficiency and low ferritin levels. By identifying gaps in knowledge and understanding, this research seeks to provide evidence that may support targeted public health interventions, early screening programs, and educational campaigns aimed at reducing the burden of iron deficiency related to chronic infections [5].

Materials and Methods

Study Design and Setting

A descriptive cross-sectional study was conducted to assess community awareness regarding *Helicobacter pylori* infection, intestinal parasitic infections, and their perceived association with iron deficiency and low ferritin levels. The study was carried out among adults residing in Zawiya area over a defined data collection period.

Study Population

The study population included adult participants aged 18 years and older. Individuals who agreed to participate and were able to complete the questionnaire were included. Participants with incomplete questionnaires were excluded from the final analysis.

Sample Size and Sampling Technique

The sample size was determined based on convenience sampling due to accessibility and willingness of participants. This sampling method was considered appropriate for assessing awareness levels in the general population.

Data Collection Tool

Data were collected using a structured, self-administered questionnaire developed after reviewing relevant literature. The questionnaire was designed in Arabic and consisted of six main sections. The first section included socio-demographic characteristics such as age, gender, educational level, place of residence, income level, and employment in the health sector. The second section assessed knowledge of *Helicobacter pylori*, including awareness, sources of information, modes of transmission, symptoms, diagnosis, and its possible relationship with iron deficiency anemia. The third section evaluated knowledge of intestinal parasitic infections, covering previous infection, perceived causes, symptoms, and their association with anemia or iron deficiency. The fourth section focused on hygienic and dietary habits, such as water consumption practices, hand hygiene, food preparation, vegetable consumption, and previous antiparasitic treatment. The fifth section investigated medical history related to iron deficiency, including previous diagnosis of anemia, laboratory testing for iron or ferritin levels, symptoms suggestive of iron deficiency, and use of iron supplements. The final section assessed awareness of the complications of low ferritin levels, including effects on concentration,



aged 18–30 years (40%), and a majority had a university education (42%). Urban residents represented 61.3% of the sample, and 28% were employed in the health sector. This demographic profile provides context for interpreting awareness and health outcomes in the subsequent analysis.

Finally, potential confounding factors such as dietary habits, socioeconomic status, and chronic diseases were not fully controlled.

Results

The study included 150 participants with a nearly equal gender distribution. Most participants were young adults

Table 1. Sociodemographic Characteristics of Participants (n = 150)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	76	50.7
	Female	74	49.3
Age group (years)	18–30	60	40.0
	31–45	52	34.7
	46–60	33	22.0
	>60	5	3.3
Education level	Primary	37	24.7
	Secondary	33	22.0
	University	63	42.0
	Postgraduate	17	11.3
Residence	Urban	92	61.3
	Rural	58	38.7
Health sector employment	Yes	42	28.0
	No	108	72.0

Table 2. Awareness, History, and Perceived Association of Participants (n = 150)

Variable	Category / Response	Frequency (n)	Percentage (%)
Awareness of <i>H. pylori</i>	Yes	101	67.3
	No	49	32.7
Awareness of intestinal parasites	Yes	98	65.3
	No	52	34.7
Previously diagnosed with anemia	Yes	59	39.3
	No	91	60.7
Belief that <i>H. pylori</i> causes anemia	Yes	83	55.3
	No	38	25.3
	Not sure	29	19.4
Belief that intestinal parasites cause anemia	Yes	90	60.0
	No	30	20.0
	Not sure	30	20.0



The merged table demonstrates that approximately two-thirds of participants were aware of *H. pylori* (67.3%) and intestinal parasitic infections (65.3%). A history of anemia was reported by 39.3% of respondents. More than half of the participants perceived that *H. pylori*

(55.3%) and intestinal parasitic infections (60%) could lead to anemia. These findings indicate a moderate level of awareness and suggest that personal experience with anemia may influence participants' knowledge of gastrointestinal infections.

Table 3. Medical History and Awareness of Iron Deficiency Complications (n = 150)

Variable	Category/Response	Frequency (n)	Percentage (%)
Previous laboratory testing for iron/ferritin	Yes	61	40.7
	No	89	59.3
Experience of fatigue	Yes	72	48.0
	No	78	52.0
Use of iron supplements	Yes	55	36.7
	No	95	63.3
Awareness of complications of low ferritin (concentration, immunity, chronic fatigue)	Yes	88	58.7
	No	62	41.3
Importance of screening for <i>H. pylori</i> and parasites	Yes	90	60.0
	No	60	40.0

This table highlights participants' medical history related to iron deficiency and their awareness of its complications. Only 40.7% had previously undergone laboratory testing for iron or ferritin. Fatigue was the most commonly reported symptom (48%), and 36.7% used iron supplements.

Awareness of the complications of low ferritin was moderate, with 58.7% recognizing its impact on concentration, immunity, and chronic fatigue. Sixty percent acknowledged the importance of screening for *H. pylori* and intestinal parasites, underscoring the need for public health education.

Table 4: Association Between Awareness and Anemia

Variable	Anemia (Yes)	Anemia (No)	χ^2 Value	p-value
Awareness of <i>H. pylori</i>	40	43	8.75	0.003*
Awareness of Intestinal Parasites	45	45	5.62	0.018*

A Chi-square test was conducted to assess the association between awareness of *Helicobacter pylori* infection and history of anemia. The results showed a statistically significant association ($\chi^2 = 8.75$, $p = 0.003$).

Similarly, awareness of intestinal parasitic infections was significantly associated with anemia ($\chi^2 = 5.62$, $p = 0.018$).

Discussion

The present cross-sectional study assessed community awareness of *Helicobacter pylori* infection and intestinal



parasitic infections, and investigated their perceived association with iron deficiency and anemia. The results showed moderate to high levels of awareness for both infections and significant associations between awareness and a history of anemia. These findings contribute valuable insight into the public's knowledge of infection-related anemia and have implications for public health strategies.

Our study found that approximately two-thirds of participants were aware of *H. pylori*, with awareness of intestinal parasitic infections reported at a similar rate (Table 2). While awareness levels were substantial, a considerable minority still lacked knowledge, underscoring gaps in public health education on infectious causes of iron deficiency. Previous studies in similar contexts have shown varying awareness levels, often tied to differences in access to health services, education, and local health promotion activities [6]. This suggests that while global awareness of these infections is improving, targeted community education remains essential.

With regards to anemia prevalence, approximately 39.3% of participants reported a history of anemia or iron deficiency, which aligns with broader epidemiological patterns in low- and middle-income settings where iron deficiency remains a common nutritional and health problem. For example, studies in Ethiopia have reported moderate anemia prevalence among dyspeptic adults, with significant associations between *H. pylori* infection, parasitic infection, and anemia (AOR 1.77 and AOR 2.14 respectively) [13]. Such findings reinforce the multifactorial nature of anemia in similar populations.

A key contribution of this study is the observation of statistically significant associations between awareness of *H. pylori* infection and a history of anemia ($p = 0.003$), as well as between awareness of intestinal parasitic infections and anemia history ($p = 0.018$). This contrasts with purely descriptive prevalence studies and suggests that personal health experiences may influence health knowledge — an observation similarly noted in clinical research where infection-related symptoms often prompt individuals to seek more information and medical care [5]. From a public health perspective, these associations highlight the potential role of health-seeking behavior and symptom experience in shaping community awareness.

The association between *H. pylori* infection and iron deficiency anemia has been well-documented in clinical and epidemiological research. For example, cohort studies conducted in clinical settings have shown a high prevalence of iron deficiency anemia among *H. pylori*-positive patients, with significantly lower serum ferritin and hemoglobin levels compared to non-infected individuals [3]. Similarly, cross-sectional research has demonstrated that *H. pylori* infection is frequently associated with unexplained iron deficiency anemia, suggesting that routine screening and treatment may help

improve iron status in affected individuals [8]. Meta-analyses further support this association, showing increased odds of iron deficiency in infected individuals and improvements in iron parameters following eradication therapy [3].

Despite these correlations, not all studies have found a direct link between *H. pylori* infection and overt anemia. For example, a cross-sectional study in Bangladesh reported that while *H. pylori*-positive patients had lower mean serum ferritin levels, hemoglobin differences were not statistically significant [13]. This suggests that the interplay between infection and anemia may be influenced by other factors such as nutritional status, chronic inflammation, and socioeconomic conditions. Nonetheless, the bulk of evidence supports the role of *H. pylori* in contributing to iron metabolism disturbances and iron deficiency, even if overt anemia is not always present.

The role of intestinal parasitic infections in iron deficiency and anemia is also supported by existing literature. Parasitic infections, particularly soil-transmitted helminths, are known to cause chronic blood loss, malabsorption, and inflammation, all of which contribute to impaired iron homeostasis and anemia [4]. Community-based studies in endemic regions consistently highlight intestinal parasites as significant contributors to anemia, reinforcing our findings that awareness of parasitic infections is associated with anemia history.

One limitation of this study is its reliance on self-reported data for anemia history, which may be subject to recall bias. Additionally, the cross-sectional design precludes causal inferences. Future research should incorporate laboratory confirmation of infection status and iron biomarkers (e.g., complete blood count, ferritin, transferrin saturation) to strengthen causal interpretation and provide more precise estimates of infection-related anemia.

In summary, the current findings demonstrate moderate community awareness of *H. pylori* and parasitic infections, and significant associations between awareness and anemia history. These results are consistent with a growing body of evidence linking chronic gastrointestinal infections to iron deficiency and highlight the need for integrated public health strategies that combine education, screening, and preventive measures to reduce the burden of infection-related anemia.

Conclusion

This study provides important insights into the awareness of *Helicobacter pylori* infection and intestinal parasitic infections among the community and their association with iron deficiency and anemia. The findings indicate that while the majority of participants were aware of these infections, a substantial proportion still lacked



knowledge, highlighting the need for targeted health education programs.

Approximately 39% of participants reported a previous history of anemia, and statistically significant associations were observed between awareness of both *H. pylori* and intestinal parasitic infections and anemia history. These results reinforce the notion that chronic gastrointestinal infections may contribute to iron deficiency anemia and that personal health experiences may influence community awareness and health-seeking behavior.

Importantly, the findings of this study **do not contradict previous research**; rather, they are consistent with

existing literature demonstrating the multifactorial etiology of anemia, including the contributions of infectious agents, nutritional status, and socio-demographic factors [6–15,18].

Overall, the study emphasizes the need for integrated public health strategies that combine **education, early diagnosis, and preventive measures** to reduce the burden of infection-related anemia in the population. Future research should incorporate laboratory confirmation of infection and iron biomarkers to strengthen causal inference and further guide intervention strategies.

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