



Article

Survey on the Knowledge and the Management of *Helicobacter pylori* Infection by Italian General Practitioners and Doctors in General Practice Training

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Abstract: The management of gastric *Helicobacter pylori* (*H. pylori*) infection represents a significant concern in primary healthcare. This survey evaluates the approaches, attitudes, and knowledge regarding gastric *H. pylori* infection among Italian general practitioners (GPs) and young doctors undergoing general practice training (ITGPs). The survey enrolled 466 GPs and 70 ITGPs. Among GPs, specialist recommendations and the Maastricht–Florence guidelines were frequently referenced sources, while ITGPs relied more on the Maastricht–Florence guidelines and internet resources. ITGPs demonstrated more proactive approaches than GPs in investigating and treating conditions such as gastric ulcers, atrophic gastritis, and iron-deficiency anemia. However, there was limited attention given to the role of *H. pylori* treatment in first-degree relatives of gastric cancer patients. The most used diagnostic methods were the urea breath test and fecal test. Triple therapy was the most frequently chosen initial treatment regimen, with quadruple bismuth therapy becoming the primary option after initial treatment failure, followed by quinolone therapy and concomitant therapy. This survey underscores a disparity between real-world practices and the recommendations outlined in current guidelines, indicating a need for improved understanding of *H. pylori* guidelines among both GPs and ITGPs.

Keywords: *Helicobacter pylori*; dyspepsia; primary care; general practice; guidelines; diagnosis; treatment



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1. Introduction

Gastric *Helicobacter pylori* (*H. pylori*) infection is one of the most common bacterial infections worldwide, usually transmitted in childhood, and persists for life if untreated [1].

Its prevalence varies significantly between different geographical regions, influenced by socioeconomic, environmental, and hygienic factors, reaching up to 50–80% of the general population in developing countries, while in industrialized countries the prevalence generally varies between 20% and 50% of the population [1–3]. In Italy, the prevalence is estimated at approximately one-third of the population [2].

It has been demonstrated that gastric *H. pylori* infection plays an important role not only in the pathogenesis of gastritis and peptic ulcers, but also in oncological pathologies such as gastric cancer or gastric mucosa-associated lymphoid tissue lymphoma, and it is also believed to be associated with numerous extra-gastric pathologies [1].

For these reasons, *H. pylori* infection has a significant impact not only on individual health, but also on public health, in terms of both morbidity and economic cost, posing a clinical challenge for healthcare providers.

The management of *H. pylori* infection is an important part of clinical practice both in specialist medicine and in primary care, taking on particular importance regarding the

appropriateness of diagnostic tests and, above all, the management of therapies based on the growing resistance to antibiotics [1].

To support appropriate decisions on the management of *H. pylori* infection, several guidelines have been developed internationally. Among these, the guidelines of the European *H. pylori* and Microbiota Study Group, known as the Maastricht–Florence guidelines, now in their sixth draft [4,5], are of particular importance, especially for European countries. Like all international guidelines, the Maastricht–Florence guidelines need to be adapted to national and local organizational models in the implementation process.

In Italy, neither the Maastricht–Florence guidelines nor those developed by a national expert consensus report in 2007 [6] have been officially implemented. Instead, the clinical practice of Italian general practitioners (GPs) has been governed by the reimbursement regulations of the healthcare system for drug prescriptions.

In 2022, an official guideline developed by the Italian Society of Gastroenterology and the Italian Society of Digestive Endoscopy was released [7]. The difficulty of implementing the guidelines is a complex problem that involves economic, managerial, and relational aspects [8]. Knowledge of the aspects of daily clinical practice that most deviate from the guidelines represents a key factor in setting up a virtuous implementation process.

This study aims to evaluate the approaches, attitudes, and knowledge regarding *H. pylori* gastric infection among Italian GPs in comparison to a group of young doctors undergoing specific training for general practice (ITGPs).

2. Results

2.1. Questionnaire Response Rate

A cohort of 910 doctors was invited to participate in the survey, comprising 800 GPs and 110 ITGPs. The survey enrolled 466 GPs, representing 58.3% of the 800 GPs invited, and 70 ITGPs, representing 63.6% of the 110 ITGPs invited.

2.2. Characteristics of Participants

In comparison to ITGPs, GPs exhibited a higher average age (57.4 ± 9.8 years vs. 32.6 ± 6.1 years; $p = 0.001$) and were predominantly male (61.4% vs. 38.6%, $p = 0.002$). Most GPs (63.3%) reported over 20 years of active service in the National Health Service (NHS), with an average patient load of 1274.8 ± 327.9 . Approximately 36.7% of GPs had pursued specialization, with only 4.1% specializing in gastroenterology. Regarding knowledge about *H. pylori*, 58.2% of GPs deemed their understanding adequate, compared to 45.7% of ITGPs ($p = 0.032$).

2.3. Sources of Information on the Management of *H. pylori* Infection

Specialist recommendations and the Maastricht–Florence guidelines were the most frequently cited sources among GPs, whereas ITGPs relied more on the Maastricht–Florence guidelines and the internet (Table 1).

Table 1. Differences in sources of information on the management of gastric *H. pylori* infection between GPs and ITGPs (multiple answers possible).

Sources	GPs n (%)	ITGPs n (%)	p-Values
Recommendations from specialists	178 (38.2%)	20 (28.6%)	n.s.
Maastricht–Florence guidelines	165 (35.1%)	28 (40.0%)	n.s.
Professional journals (printed or online)	126 (27.0%)	15 (21.4%)	n.s.
Directives from national/local health system	114 (24.5%)	14 (20.0%)	n.s.
Educational courses on <i>H. pylori</i> or dyspepsia	112 (24.0%)	22 (31.4%)	n.s.
Other international guidelines	102 (21.9%)	18 (25.7%)	n.s.
Other internet resources	70 (15.0%)	24 (34.3%)	0.002
Advice from a colleague general practitioner	49 (10.5%)	19 (27.1%)	0.002

GPs = general practitioners; ITGPs = doctors in training for general practice; n.s. = not significant.

2.4. Clinical Conditions of Interest in the Search for Gastric *H. pylori* Infection

Although both groups recognized *H. pylori* infection as a significant risk factor for gastric cancer (81.6% for GPs and 91.4% for ITGPs), ITGPs were more inclined to believe that eradicating the infection could prevent cancer (92.9% vs. 86.8%, $p = 0.017$).

Table 2 provides insights into the search for and treatment of *H. pylori* infection. Key indications for investigation among GPs included uninvestigated dyspepsia in young subjects without alarm symptoms, gastric ulcer, duodenal ulcer, chronic non-atrophic gastritis, and atrophic gastritis. ITGPs demonstrated greater attention than GPs to gastric ulcer and atrophic gastritis.

Table 2. Differences in clinical conditions of interest in the search for gastric *H. pylori* infection between GPs and ITGPs (multiple answers possible).

Clinical Conditions	GPs n (%)	ITGPs n (%)	<i>p</i> -Values
Uninvestigated dyspepsia in patients aged < 50 years	313 (67.2%)	52 (74.3%)	n.s
Gastric ulcer	304 (65.2%)	58 (82.9%)	0.005
Duodenal ulcer	237 (50.9%)	44 (62.9%)	n.s
Chronic non-atrophic gastritis	196 (42.1%)	27 (38.6%)	n.s
Chronic atrophic gastritis	170 (36.5%)	41 (58.6%)	0.011
Gastroesophageal reflux disease	142 (30.5%)	32 (45.7%)	0.032
Functional dyspepsia (EGD negative)	121 (26.0%)	22 (31.4%)	n.s
First-degree family members of patients with gastric cancer	120 (25.6%)	19 (27.1%)	n.s
Gastric cancer	86 (18.5%)	26 (37.1%)	0.012
Iron-deficiency anemia of unknown origin	81 (17.4%)	22 (31.4%)	0.007
Start of long-term therapy with proton-pump inhibitors	52 (11.2%)	10 (14.3%)	n.s
Start of long-term therapy with NSAIDs *	50 (10.7%)	3 (4.3%)	n.s
Patient request	46 (9.9%)	6 (8.6%)	n.s
Dermatitis of unknown origin	32 (6.9%)	4 (5.4%)	n.s
Irritable bowel syndrome	18 (3.9%)	6 (8.6%)	n.s

GPs = general practitioners; ITGPs = doctors in training for general practice. * NSAIDs = non-steroidal anti-inflammatory drugs; n.s. = not significant.

Limited attention was observed towards the role of *H. pylori* treatment in patients with gastric cancer, first-degree relatives of gastric cancer patients, and functional dyspepsia, with ITGPs showing more interest in patients with iron-deficiency anemia compared to GPs.

2.5. Diagnostic Methods for Gastric *H. pylori* Infection

The most utilized diagnostic methods (Table 3) were the urea breath test and fecal test. Both groups relied on bacterium detection during esophagogastroduodenoscopy, with no significant differences observed.

Table 3. Differences in the tests utilized for the diagnosis of *H. pylori* infection and the control after treatment between GPs and ITGPs (multiple answers possible).

Test	First Diagnosis of <i>H. pylori</i> Infection			Control after Treatment		
	GPs n (%)	ITGPs n (%)	<i>p</i> -Values	GPs n (%)	ITGPs n (%)	<i>p</i> -Values
Urea breath test	311 (66.7%)	55 (78.6%)	n.s	212 (45.6%)	45 (67.2%)	0.002
Fecal antigen test	314 (67.4%)	48 (68.6%)	n.s	298 (64.1%)	33 (49.3%)	0.027
Serology	68 (14.7%)	17 (24.3%)	n.s	69 (14.8%)	5 (7.5%)	n.s
Histology/rapid urease test	176 (37.8%)	33 (47.1%)	n.s	29 (6.2%)	6 (9.0%)	n.s

GPs = general practitioners; ITGPs = doctors in training for general practice; n.s. = not significant.

2.6. Post-Treatment Control of Gastric *H. pylori* Infection

Most GPs (76.4%) and ITGPs (72.9%) reported always checking for eradication after treatment completion; 14.2% of GPs and 11.4% of ITGPs indicated that they only ensure eradication if the patient remains symptomatic, while 9.3% of GPs and 11.4% of ITGPs based the control on the patient's pathology. ITGPs tended to perform eradication control earlier, with 28.4% scheduling it after at least 2 weeks and 71.6% after at least 4 weeks, compared to GPs (11.8% and 88.2%, respectively; $p = 0.001$).

In post-treatment evaluation, GPs more frequently utilized the fecal test, while ITGPs preferred the urea breath test (Table 3).

2.7. Therapeutic Choices for the Treatment of Gastric *H. pylori* Infection

Most GPs (83.9%) and ITGPs (82.9%) reported treating all patients with *H. pylori* infection, with a small percentage preferring selective treatment based on patient pathology.

Regarding treatment frequency, many GPs (49.1%) reported treating 5–15 cases per year: 34.1% treated fewer than 5 cases per year, 49.1% between 5 and 15 cases per year, and 10.1% more than 15 cases per year, while 6.7% were unable to quantify the number of treatments. GPs more frequently personally administered eradication therapy (76.6% almost always or often, 20.4% rarely, 3.0% never). Approximately one-third of both GPs and ITGPs were aware of the frequency of clarithromycin resistance in their area (35.4% of GPs and 38.6% of ITGPs).

Table 4 outlines the treatment regimens that participants identified as their first choice. Triple therapy emerged as the most frequently selected initial treatment regimen by both GPs and ITGPs, albeit with some variations in duration. Quadruple therapy and concomitant therapy were more commonly utilized by ITGPs.

Table 4. Differences in the use of first-line therapies for *H. Pylori* infection between GPs and ITGPs.

Regimen	GPs n (%)	ITGPs n (%)	<i>p</i> -Values
Dual therapy			
7 days	21 (4.5%)	0 (0.0%)	n.s
10 days	7 (1.5%)	1 (0.1%)	n.s
14 days	9 (1.9%)	2 (0.3%)	n.s
Triple therapy			
7 days	136 (29.2%)	10 (14.3%)	0.014
10 days	109 (23.4%)	21 (30.0%)	0.010
14 days	82 (17.6%)	22 (31.4%)	0.001
Quadruple therapy			
10 days	69 (14.8%)	22 (31.4%)	0.001
Concomitant therapy			
7 days	49 (10.5%)	7 (10.0%)	n.s
10 days	46 (9.9%)	14 (20.0%)	0.021
Sequential therapy			
10 days	79 (17.0%)	9 (12.9%)	n.s
14 days	52 (11.2%)	12 (17.1%)	n.s
Quinolone therapy			
10 days	39 (8.4%)	5 (7.1%)	n.s

GPs = general practitioners; ITGPs = doctors in training for general practice; Dual therapy = amoxicillin + PPI; Triple therapy = amoxicillin + clarithromycin + PPI; Concomitant therapy = amoxicillin + clarithromycin + metronidazole/tinidazole + PPI; Sequential therapy = amoxicillin + PPI (5 days), followed by clarithromycin + metronidazole/tinidazole + PPI (5 days); Quadruple therapy = bismuth + tetracycline + metronidazole/tinidazole + PPI; Quinolone therapy = amoxicillin + levofloxacin + PPI; PPI = proton-pump inhibitor; n.s. = not significant.

After treatment failure, quadruple bismuth therapy emerged as the predominant option for both groups, followed by quinolone therapy and concomitant therapy (Table 5). ITGPs exhibited a greater preference for quinolone therapy than GPs.

Table 5. Differences in the use of second-line therapies for *H. Pylori* infection between GPs and ITGPs.

Regimen	GPs n (%)	ITGPs n (%)	p-Values
Dual therapy			
7 days	7 (1.5%)	0 (0.0%)	n.s
10 days	6 (1.3%)	0 (0.0%)	n.s
14 days	7 (1.5%)	1 (0.1%)	n.s
Triple therapy			
7 days	17 (3.6%)	2 (0.3%)	n.s
10 days	16 (3.4%)	1 (0.1%)	n.s
14 days	30 (6.4%)	3 (4.3%)	n.s
Quadruple therapy			
10 days	150 (32.2%)	26 (37.1%)	n.s
Concomitant therapy			
7 days	49 (10.5%)	5 (7.1%)	n.s
10 days	79 (17.0%)	19 (27.1%)	n.s
Sequential therapy			
10 days	64 (13.7%)	8 (11.4%)	n.s
14 days	73 (15.7%)	16 (22.9%)	n.s
Quinolone therapy			
10 days	85 (18.2%)	22 (31.4%)	0.016

GPs = general practitioners; ITGPs = doctors in training for general practice; Dual therapy = amoxicillin + PPI; Triple therapy = amoxicillin + clarithromycin + PPI; Concomitant therapy = amoxicillin + clarithromycin + metronidazole/tinidazole + PPI; Sequential therapy = amoxicillin + PPI (5 days), followed by clarithromycin + metronidazole/tinidazole + PPI (5 days); Quadruple therapy = bismuth + tetracycline + metronidazole/tinidazole + PPI; Quinolone therapy = amoxicillin + levofloxacin + PPI; PPI = proton-pump inhibitor; n.s. = not significant.

3. Discussion

Our survey's findings offer valuable insights into the knowledge, attitudes, and practices surrounding the management of *H. pylori* infection among GPs and ITGPs in Italy. The number of participating GPs was consistent with figures from several other international surveys [9–11]. Notably, the survey successfully captured a significant portion of the invited GPs and ITGPs, providing a comprehensive understanding of their approaches to *H. pylori* management.

Demographic data regarding the sex and age distribution of GPs reflect the reality of Italian general practice. In comparison to other international surveys, Italian GPs were found to be more frequently male [12] and older [9,12], which may be attributed to the delayed generational turnover in Italian primary care. This is confirmed by the fact that ITGPs were more frequently female than GPs, and that a notable proportion of GPs reported extensive experience within the National Health Service.

The survey uncovered disparities in knowledge regarding *H. pylori* infection between GPs and ITGPs, with a larger percentage of GPs expressing confidence in their knowledge compared to ITGPs. The Maastricht–Florence guidelines, in whose drafting Italian experts participated, are a point of reference, especially for Western European countries. The most recent Italian guidelines on *H. pylori* infection are substantially aligned with the Maastricht–Florence guidelines as regards indications and methods of investigation to search for infection.

Although both groups referenced established guidelines like the Maastricht–Florence guidelines, ITGPs demonstrated a greater dependency on internet sources for information, suggesting a potential preference for digital resources among younger medical practitioners. In a survey conducted in Hungary [11], postgraduate training emerged as the most favored source of information, whereas in Israel 50% of respondents reported relying on professional guidelines [13]. Knowledge of the Maastricht–Florence guidelines in Spain was found to be below 50% [12].

The survey underscored disparities in clinical focus and treatment preferences between GPs and ITGPs. ITGPs displayed greater proactivity in investigating and treating conditions like gastric ulcer, atrophic gastritis, and iron-deficiency anemia. The strategy of

testing and treating *H. pylori* infection in uninvestigated dyspepsia among young subjects without alarm symptoms aligned with findings from surveys conducted in Israel [13] and Hungary [11]. However, this approach was not extensively promoted in Italy until the release of the recent 2022 guidelines, nor was it reimbursed by the National Health System. A substantial proportion of GPs did not mention peptic ulcer as a target of treatment for *H. pylori* infection, highlighting potential gaps in clinical awareness.

Both GPs and ITGPs acknowledged *H. pylori* infection as a significant risk factor for gastric cancer; however, ITGPs demonstrated a stronger belief in the preventive role of eradicating the infection.

The findings of this study are similar to those obtained in Croatia [10] but differ from those in Israel, where only 45.0% of respondents believed that the organism is carcinogenic, and only 65.0% agreed that *H. pylori* eradication reduces the risk of developing gastric cancer [9]. Despite the recognized pathogenetic role of cancer, there was limited attention to the eradication of *H. pylori* infection in patients with gastric cancer, mirroring the practices in Israel [9,13] and contrasting with data from Hungary [11]. Similarly, scarce emphasis was placed on the investigation and treatment of first-degree relatives of patients with gastric cancer. In Israel, this practice was more frequent, albeit not optimal [9].

Over 30% of participants indicated gastroesophageal reflux disease as a condition warranting the eradication of the infection, despite current guidelines not considering it to be an indication for treatment unless the patient with reflux disease is a candidate for prolonged gastric acid suppression therapy. Italian GPs demonstrated minimal interest in the role of gastric *H. pylori* infection in irritable bowel syndrome, a condition not typically associated with such an infection [14,15].

The structure of this study does not allow us to understand why family doctors show less interest in the eradication of gastric *H. pylori* infection in various pathologies. The fault could lie with a certain therapeutic inertia that can develop over the course of the profession, due, among other things, to the large number of pathologies to be addressed.

Both GPs and ITGPs relied on non-invasive diagnostic methods, such as the urea breath test and fecal test, with minimal differences observed between the two groups. The preference of GPs for the fecal test may be pragmatically attributable to the greater territorial availability of this test. This approach aligns with the recommendations outlined in both the Maastricht–Florence and Italian guidelines. Comparisons with other countries may be influenced by varying national and local organizational contexts. For instance, in Spain, 16% of respondents reported having no direct access to any validated diagnostic method, with only 44% having access to the urea breath test [12].

Most participants reported treating all patients diagnosed with *H. pylori* infection. In contrast, in Croatia, only 59.0% of general practitioners indicated that they would treat all patients [10].

Less than 40% of both GPs and ITGPs indicated awareness of the frequency of local resistance of *H. pylori* to antibiotics. This lack of awareness could present a challenge in treatment settings, particularly in regions like Southern Europe, known for high rates of *H. pylori* resistance to clarithromycin [16,17]. The reasons for lack of awareness regarding the rates of local antibiotic resistance can be many, including poor diffusion of antibiotic susceptibility tests in the case of gastric *H. pylori* infection, scarce availability of specific local resistance registers, and poor dissemination of available data, especially among general practitioners. Certainly, a lack of awareness regarding local rates of antibiotic resistance can lead to the use of inappropriate therapies and, therefore, limited effectiveness and a further increase in resistance. It is advisable to implement a specific program for monitoring the rates of resistance to *H. pylori* as part of the collaboration between GPs, specialists, and the National Health Service, as already frequently happens for urinary tract infections, for example.

As regards therapeutic choices, the Italian guidelines also include sequential therapy among the first-choice therapies, which has demonstrated good results in this country. In terms of second-line therapies in case of failure of the initial therapy, the Maastricht–

Florence guidelines and the Italian ones coincide. Despite the good results obtainable overall in the European region from triple therapy based on clarithromycin, as highlighted by a recent review [18], the situation in Southern Europe, characterized by high (>15%) resistance to clarithromycin, suggests using this therapy only in areas with demonstrated low resistance [16,17,19]. The treatment approaches in our study exhibited variations, with triple therapy emerging as the preferred initial regimen for both groups. Clarithromycin resistance in *H. pylori* infection is notably high and increasing in Italy [17,20,21], rendering standard triple therapy potentially ineffective [22]. The overall efficacy of triple therapies has significantly declined in Italy, prompting calls to abandon them altogether due to their consistently low success rates [23]. Both the Maastricht–Florence guidelines and recent Italian guidelines advise against triple therapy as a first-line choice; however, clarithromycin-based standard triple therapy is the most preferred regimen in several European primary care settings [8–10]. Notably, triple therapy with amoxicillin and clarithromycin is also commonly prescribed by European gastroenterologists [24], with a slow adaptation to current recommendations by specialists as well [24–26]. Recent data suggest satisfactory eradication rates in Italy with bismuth-based regimens and quadruple therapies [17,23], and prescriptions for triple therapy have decreased [24].

Most participants affirmed that they consistently verify eradication, with ITGPs conducting post-treatment assessments earlier than GPs.

Although the frequency of post-therapy control aligned with findings from other countries [9,11,12], the importance of a confirmatory test after *H. pylori* treatment must be underlined, since it confirms effectiveness both at the individual level and for epidemiological purposes [27]. The post-treatment confirmation of eradication is recommended in all sets of published guidelines on the topic; however, retesting rates remain poor, ranging from 30% to 70% in different studies [28,29]. The importance of post-treatment confirmation appears intuitive based on the risk of disease recurrence, persistence, or development of future complications (e.g., gastric cancer), but it is also driven by concerns over emerging antimicrobial resistance and declining global eradication rates of traditional treatment regimens [29]. The data from our survey show that cases of failure to retest are linked to a choice not to retest patients with resolution of symptoms or pathologies considered minor, unlike studies in which the reasons were mainly organizational in the absence of a continuum of care [29]. These results confirm the need for the dissemination of guidelines aimed at achieving the best clinical practice. Moreover, the study revealed disparities in post-treatment evaluation practices, with GPs showing a preference for the fecal test while ITGPs leaned towards the urea breath test. The choice of test may be influenced by specific local organizational protocols.

Quadruple bismuth therapy emerged as the most prescribed second-line treatment, followed by quinolone therapy and concomitant therapy. These findings align more closely with international guidelines and national recommendations, as well as with the literature from Italy [17] and Europe [30]. Studies from European countries have shown that this second-line regimens offer optimal effectiveness [25,30].

As regards therapeutic choices, Italian GPs seem to pay for the lack of dissemination of guidelines, continuing to favor triple therapy with clarithromycin as the initial test. The ITGPs instead showed that they are aware of the most recent guidelines in their preferences for both initial and second-line treatments.

This study has several limitations. The sample of doctors examined, although large, did not include all Italian regions and was not selected with specific representativeness criteria. In a healthcare system like the Italian one, which is fragmented into regional realities, local organizational aspects, especially regarding diagnostic tests, can represent a factor influencing the activities of doctors, irrespective of their desire to adhere to the guidelines.

4. Materials and Methods

4.1. Participants

Doctors from 8 different regions across Italy were invited to participate in the survey. The GPs invited were randomly chosen from the list of doctors registered with the National Health Service of one of the provinces of each of the 8 Italian regions involved (3 in the north, 2 in the center, and 3 in the south and islands). The cohort of ITGPs was chosen by inviting all of the doctors participating in the last year of the specific training course in general medicine from the schools of 3 of the 8 Italian regions involved (1 in the north, 1 in the center, and 1 in the south). GPs were contacted via email and provided with a link to an anonymous survey form, while ITGPs were asked to complete the survey anonymously after a day of unrelated teaching activities. The ITGPs invited were still partly engaged in an educational framework, with limited direct prescribing responsibilities.

4.2. Questionnaire

The survey questionnaire covered various topics, including participants' demographic and professional backgrounds, their approaches to managing *H. pylori* infections, sources of information, knowledge adequacy, oncological considerations, patient demographics, diagnostic methodologies, and pharmaceutical interventions. Responses were collected anonymously and stored in an electronic database.

4.3. Statistical Analysis

Categorical data were summarized using absolute and relative frequencies, while continuous data were presented as means and standard deviations. Qualitative factors were analyzed via chi-squared or z-tests for proportions, and quantitative factors were assessed using Mann–Whitney U tests, with significance set at 0.05. Statistical analyses were conducted utilizing STATA version 16 (Stata Corp, College Station, TX, USA).

The survey adhered to the principles outlined in the Declaration of Helsinki. Since it involved anonymous participation by professionals, it did not require review by an ethics committee. However, prior to participation, each physician provided individual consent for the anonymous utilization of the data that they provided in the questionnaire.

5. Conclusions

Our survey highlights a need for improvement in the knowledge of *H. pylori* guidelines among both GPs and ITGPs. Like other countries, there exists a gap between real-world practices and the recommendations provided in the current guidelines. Research has shown that adherence to guidelines can be influenced by several factors, including younger age, practicing in central urban clinic locations, and encountering a high volume of *H. pylori* patients [9]. However, it is crucial to prioritize the implementation of guidelines, especially among younger healthcare professionals.

Simplifying the guidelines and identifying barriers to their implementation are essential steps forward. An online survey conducted among Italian gastroenterologists and gastroenterology fellows indicated that specialists generally adhere more closely to guideline recommendations than gastroenterology fellows, but the adherence to the recommended first-line treatment regimen remains suboptimal for both groups [31]. Addressing gaps in awareness, adopting evidence-based treatment approaches, and promoting interdisciplinary collaboration are crucial measures to optimize patient care and reduce the burden of *H. pylori*-related diseases.

In summary, the results of our survey underscore the importance of continuous education and training initiatives to improve knowledge and clinical practices related to *H. pylori* management among healthcare professionals in Italy. Further research is needed to evaluate the impact of educational interventions and strategies for disseminating guidelines on clinical outcomes and healthcare delivery in this field.

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