Original Article

Knowledge, and Practice of Helicobacter Pylori Infection among Primary healthcare physicians in Sohag Governorate

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Abstract

Background: Worldwide H. pylori (H. pylori) bacterial infection ranks as one of the most persistent chronic infections although Egyptian populations along with developing countries report very high occurrence rates. Primary health care (PHC) physicians form the first defense of healthcare systems because they detect patients early while teaching prevention methods and implementing strategies to control H. pylori infection.

Objectives: A cross-sectional survey happened at Sohag Governorate to determine how well PHC physicians understand H. pylori prevention strategies.

Methods: The evaluation of physician understanding about H. pylori transmission modes as well as risk factors and prevention strategies and clinical management and care involved distribution of structured questionnaires to a sampling of PHC physicians.

Result: Doctors exhibited diverse knowledge levels according to the study findings as physicians showed satisfactory understanding of testing methods alongside lack of essential knowledge about evidence-backed prevention methods. The survey exposed insufficient implementation of standard procedures between physician and patient education as well as hygiene promotion. The combination of practitioner time spent in practice along with ongoing medical training and health guideline access produced superior knowledge and clinical practices.

Conclusions: Existing data demonstrates an immediate priority to create specific educational initiatives alongside professional development training with standardized H. pylori prevention guides in primary health care facilities. The elimination of these gaps will lead to improved H. pylori infection reduction activities and better public health results by primary health care physicians throughout the area.

Introduction:

Helicobacter pylori (H. pylori) represent one of the most common and medically prominent infections worldwide. H. pylori is a type of bacteria that primarily infects the stomach lining and is associated with various gastrointestinal conditions. [1]

Approximately one-half of the world's population has H. pylori infection. [2] The prevalence of H. pylori varies by geographical location, ethnic background, socioeconomic conditions, and age. Prevalence rates are generally much higher in developing countries compared to developed countries. [3]

The prevalence rates of H. Pylori in Egypt are relatively high. H. pylori infections has been reported, it is ranging from 70% in the general population, 73% among school children, up to 88% in patients with chronic active HCV. [4] The recent studies in Egypt revealed that the prevalence of H. pylori is up to 70% in dyspeptic patients . [5]

H. pylori may spread from person to person in mysterious ways. H. pylori seem to have a limited host range, and new infections are thought to arise via direct transmission from person to person or environmental contamination as the only known reservoir. Vertical and horizontal transmission are the two basic types of person-to-person communication. [6]

Many studies have studied the link between H. pylori infection and familial exposure. It seems that H. pylori infections occur in families in clusters, according to this research [16]. Families with a history of H. pylori infection, who have been exposed to the same source of infection, or who have a similar socioeconomic status may be more likely to get the illness [7] When a woman is infected with the H. pylori bacterium, her kid is most likely to get sick as well.Among populations with a high prevalence of Helicobacter pylori and low socioeconomic status, infected moms have a less role in transmission within the family than transmission among siblings or outside acquisition. There are three different methods in which it can be transmitted from one person to another: the oral-oral, gastrointestinal, and fecal-oral routes . [8]

Public health suffers major disruptions worldwide since Helicobacter pylori (H. pylori) infection affects developing nations most gravely because they contain high infection rates. Gram-negative

Helicobacter pylori bacterium manifests strong relationships with diverse gastrointestinal conditions starting from gastritis that can trigger the onset of peptic ulcers and likely progress toward gastric cancer development. Understanding both transmission patterns of H. pylori infection and established preventive methods along with risk factor identification requires primary health care physicians to take control in these areas.

H. pylori disease prevalence runs high in Sohag Governorate and other parts of Upper Egypt because of healthcare limitations and both financial difficulties and environmental elements. Health education for patients plays equally important roles alongside diagnostic initiatives which together implement preventive measures through primary healthcare standards. The perception of H. pylori prevention by PHC physicians requires clarification in order for health professionals to create more effective training approaches and policy solutions.

The statement of problem

The medical community faces a major challenge in developing effective prevention strategies and disease control measures for Helicobacter pylori infection because of high infection levels and serious health complications particularly in low-resource Sohag Governorate located in Upper Egypt. Because patients initially approach primary health care physicians these clinicians serve as early detection specialists who also educate patients about prevention strategies. There is insufficient evidence about how much knowledge primary health care physicians possess regarding H. pylori prevention methods and best practices within this geographic region. We conducted this research to determine the knowledge level and preventive actions of Sohag PHC physicians regarding H. pylori, and to detect gaps in knowledge and practices will serve to create specialized educational initiatives with community-based public health policies that enhance patient conditions and decrease H.

The aim of study

This research evaluates knowledge and practices among Sohag Governorate PHC physicians about H. pylori infection and their current preventive

measures to enhance primary health care approaches.

Subjects and Methods

This cross-sectional study **was carried out on 400** primary healthcare physicians admitted to Health Care Units of Sohag Governorate, Sohag, Egypt, in the duration from October 2024 to December 2024.

After approval from the Ethics Committee of the Faculty of Medicine, Sohag University and an informed written consent was obtained from the participants. Ethical consideration was observed in each step of the study conducted. In addition, the objectives and steps of the study were explained to the participants, before taking any information.

Inclusion criteria:

- Physicians either male or female at primary healthcare units in Sohag Governorate.

Exclusion criteria:

- Non-medical personnel.
- GIT specialists.
- Physicians at secondary or tertiary healthcare centers.

Methodology:

The subject and method of this study were portrayed under the following four designs as follows:

I. Technical Design.
II. Operational Design.
III. Administrative Design.
IV. Statistical Design.

I. Technical Design:

The technical design includes research design, setting, subject, and tools for data collection.

Research design:

A descriptive research design was utilized to assess the time and content validity of the tool and to detect any problem peculiar to data collection tool that may face the researcher.

Setting:

The study was conducted at the Health Care Units of Sohag governorate, Sohag, Egypt, in the duration from October 2024 to December 2024.

Subject:

All Data was collected through Online and personal interviews with the primary healthcare physicians at health care units using a specially designed multi-item questionnaire after explaining the nature and aim of study to the eligible persons.

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Sample type:

A convenient sampling technique was employed in the current study.

Tools for data collection (Appendix I):

Data from the current study was collected by utilizing the following tool: The first tool is the structured interviewing & Online questionnaire: This tool was developed by the investigators after reviewing the national and international related literature. It contained three parts:

Part I: primary healthcare physicians demographic characteristics:

This part was concerned with demographic characteristics such as age, sex, marital status, occupation, and residence

Part II: Knowledge questionnaire:

It aims to evaluate primary healthcare physicians' knowledge regarding the prevention of Helicobacter pylori. It consisted of multiple-choice questions, primary healthcare physicians were asked to choose more than one answer, The scores ranged between, (2) for complete correct answer, (1) for incomplete correct answers and (0) for don't know.

Total knowledge scoring system: Poor knowledge: 75% of total knowledge score (37-48).

Part III: Primary healthcare physicians reported practices regarding the prevention of H. pylori:

It was developed by the investigator after reviewing related literature. It was constructed to assess physicians ' performance regarding the prevention of Helicobacter pylori. It included eight separate checklists for eight procedures (61 items) regarding house and environment (8 items), handwashing (8 items), choice of food (8 items), food preparation (5 items), food cooking (14 items), food separation (5 items), food refrigeration (4 items), and personal hygiene (9 items). Scores ranged between Always=4, usually=3, sometimes=2, rarely=1, and never=0, with higher scores indicating adequate practices. Total reported practices score.

o Unsatisfactory practice: <60% of total practice score.
o Satisfactory practice: 60 of total practice score

Tools Validity:

The study tools were revised for clarity, relevance, comprehensiveness understanding, and applicability by experts to measure the content

validity of the tools and clarity. Modifications were made accordingly.

Reliability:

The study tool was tested for its internal consistency using Cronbach's alpha. It was 0.837 and 0.932 for both knowledge and reported practice checklist tools respectively.

II.   Operational design:

The operational design includes the preparatory phase, pilot study, and fieldwork.

a) Preparatory phase:

This phase started with a review of current and past, national, and international related literature concerning the study subject, using textbooks, articles, journals, and websites. This review was helpful to the investigator in reviewing and developing the data collection tools, and then the investigator tested the validity of the tool through a jury of experts to test the content, knowledge, accuracy, and relevance of questions for tools.

Pilot Study:

A pilot study was conducted on 10% of the primary healthcare physicians under study to evaluate the applicability, efficiency, and clarity of tools, and assessment of the feasibility of field work, besides detecting any possible obstacles that might face the investigator and interfere with data collection. The pilot study subjects were included in the actual study sample.

b) Fieldwork (Implementation phase):

Data collection of the study was started at the beginning of October 2024, and completed by the end of December 2024.

The investigator attended the health care units of Sohag governorate, two days per week from 9 a.m. to 12 p.m. The purpose of the study was simply explained to assess the time and content validity of the tool and to detect any problem peculiar to data collection tool that may face the researcher.

c) Ending phase:

The investigator gave the primary healthcare physicians the interviewing questionnaire to fill out, then an observation checklist was filled in by the investigator. The data collection process consumed 15 to 25 minutes per participant.

III. Administrative design:

IV. The Dean of the Ethics Committee at Sohag University Faculty of Medicine in Egypt granted authorization to execute this research.

Statistical design:

The collected data were organized and analyzed using appropriate statistical significance tests. The data were collected and coded using the Computer Statistical Package for Social Science (SPSS), version 25, and was also used to do the statistical analysis of data. Data were presented using descriptive statistics in the form of frequencies and percentages. Pearson Correlation Coefficient and Paired Samples t-tests were used to compare frequencies between study variables.

Degrees of the significance of results were considered as follows:

o   p-value > 0.05 Not significant (NS)
o   p-value ≤ 0.05 Significant (S)
o   p-value ≤ 0.01 Highly Significant (HS).

Statistical analysis

Statistical analysis was done by SPSS v26 (IBM Inc., Chicago, IL, USA). Shapiro-Wilks test and histograms were used to evaluate the normality of the distribution of data. Quantitative parametric data were presented as mean and standard deviation (SD). Quantitative non-parametric data were presented as median and interquartile range (IQR). Qualitative variables were presented as frequency and percentage (%).

This study was a descriptive cross-sectional study conducted on 400 primary healthcare physicians.

Table 1: Demographic data of the studied physicians

		N=400
Age	**20-30 years**	323 (80.75%)
	30-40 years	77 (19.25%)
	>40 year	0 (0%)
Specialization	**General practitioners**	272 (68%)
	Family physicians	128 (32%)
Years of experience	**0-2 years**	177 (44.25%)
	3-5 years	168 (42%)
	>5 years	55 (13.75%)

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The age were 323 (80.75%) physicians ranged from 20 to 30 years and 77 (19.25%) physicians ranged from 30 to 40 years. 272 (68%) physicians physicians were general practitioners, and 128 (32%) were family physicians. Years of experience was (0-2) years in 177 (44.25%) physicians, (3-5) years was 168 (42%) physicians, and >5 years in 55 (13.75%) physicians.

Table 2: Knowledge questionnaire of the studied physicians

		N=400
What is H. Pylori?	**A type of bacteria**	391 (97.75%)
	A virus	0 (0%)
	A parasite	9 (2.25%)
	I don't know	0 (0%)
What is the approximate prevalence of H. pylori infection in your community?	**<20%**	20 (5%)
	20-40%	133 (33.25%)
	41-60%	105 (26.25%)
	>60%	142 (35.5%)
How do you think H. pylori is transmitted?	**Contaminated food or water**	293 (73.25%)
	Close contact with an infected	126 (31.5%)
	Poor hygiene	107 (26.75%)
	I don't know	18 (4.5%)
Where does H. pylori primarily infect the body?	**Lungs**	16 (4%)
	Stomach	376 (94%)
	Intestines	7 (1.75%)
	Other	0 (0%)
Are you aware of the association between H. pylori and the following conditions?	**Peptic ulcers**	329 (82.25%)
	Gastric cancer	168 (42%)
	Chronic gastritis	221 (55.25%)
	Non-ulcer dyspepsia	142 (35.5%)
	Other	14 (3.5%)
Do you believe everypatient with dyspepsia should be tested for H.pylori?	**Yes**	232 (58%)
	No	101 (25.25%)
	Unsure	67 (16.75%)
Which of the tests is the gold standard when testing for H. Pylori infection?	**Urea breath test**	102 (25.5%)
	H. Pylori serology	46 (11.5%)
	Stool antigen test	163 (40.75%)
	All answers are correct	89 (22.25%)
Which diagnostic tests do you commonly use to confirm H. pylori infection?	**Urea breath test**	87 (21.75%)
	Stool antigen test	299 (74.75%)
	Endoscopic biopsy	84 (21%)
	Serological tests	73 (18.25%)
	Other	0 (0%)
In which situations do you test for H. pylori?	**Dyspeptic symptoms**	316 (79%)
	Family history of gastric cancer	42 (10.5%)
	Chronic NSAID use	7 (1.75%)
	Other	3 (0.75%)
Do you test patients for eradication success after treatment?	**Yes**	274 (68.5%)
	No	126 (31.5%)
To avoid false negative test it's recommended to	**Stop antibiotics for at least 4 weeks**	203 (50.75%)
	Stop PPI for at least 2 weeks	163 (40.75%)
	Stop antibiotics for at least 2 days	106 (26.5%)
	Stop PPI for at least 2 days	75 (18.75%)

Majority of physicians (97.75%) were correctly identified H. pylori as a type of bacteria, very few of physicians (2.25%) were incorrectly identified it as parasite.

A large portion of physicians (35.5%) believed the prevalence of H. pylori infection in their community is greater than 60% and 33.25% physians believed the prevalence of H. pylori infection in their community is 20-40%.

A large portion of physicians (73.25%) believed the H. pylori is transmitted through contaminated food or water and (31.5%) physicians believed close contact with an infected person plays a role, and a minor of physicians (26.75%) believed that poor hygiene could be a transmission vector.

Nearly all respondents (94%) correctly identified the stomach as the primary location where H. pylori infects and only (4%) of physicians mentioning the lungs and (1.75%) of physicians chose intestines.

Most of physicians (82.25%) were aware of the link between H. pylori and peptic ulcers followed by (55.25%) physicians were aware of the association with chronic gastritis and (42%) physicians were aware of the link between H. pylori and gastric cancer. (35.5%) physicians that H. pylori was tested in every dyspepsia.

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Less than half of healthcare physicians (40.75%) prefer using the stool antigen test, (25.5%) of healthcare physicians prefer using urea breath test as gold standard when testing for H. Pylori infection. Nearly half of healthcare physicians (49.25%) commonly used the stool antigen test to confirm H. pylori infection followed by (18%%) of physicians used serological tests. 274 (68.5%) physicians tested patients for eradication success post-treatment, which is essential for ensuring that the infection has been cleared.

203 (50.75%) healthcare physicians believed in stopping antibiotics for at least 4 weeks before testing for H. pylori with others (40.75%) and (18.75%) healthcare physicians recommended stopping proton pump inhibitors (PPI) for varying lengths of time.

316 (79%) healthcare physicians chose the dyspeptic symptoms followe by 42 (10.5%) healthcare physicians chose the family history of gastric cancer.

Table 3: Management practices questionnaire of the studied physicians

		N=400
Who should receive treatment for Helicobacter pylori infection?	**All individuals with mild dyspepsia symptoms**	112 (28%)
	Patients diagnosed with gastric or duodenal ulcers	166 (41.5%)
	Individuals with a family history of gastrointestinal cancers, regardless of H. pylori status	0 (0%)
	Every asymptomatic person found to have H. pylori during routine screening	122 (30.5%)
What first-line treatment regimen do you typically prescribe for H. pylori infection?	**Triple therapy (PPI +2 antibiotics)**	332 (83%)
	Quadruple therapy (PPI + 2 antibiotics + bismuth)	68 (17%)
	Other	0 (0%)
How do you decide on the choice of antibiotics?	**Local antibiotic resistance patterns**	105 (26.25%)
	Patient's previous antibiotic exposure	119 (29.75%)
	Cost and availability	157 (39.25%)
	Other	19 (4.75%)
For how long do you indicate eradication therapy?	**5 days**	13 (3.25%)
	7 days	65 (16.25%)
	14 days	269 (67.25%)
	20 days	53 (13.25%)
How long after eradication treatment do you order a diagnostic test to demonstrate eradication?	**2 days after cessation of therapy**	53 (13.25%)
	2 weeks after cessation of therapy	198 (49.5%)
	4 weeks after cessation of therapy	149 (37.25%)
Do you consider patient adherence a major challenge in H. pylori treatment?	**Yes**	352 (88%)
	No	48 (12%)
How often do you encounter treatment failure in H. pylori cases?	**Rarely (<10%)**	38 (9.5%)
	Occasionally (10-30%)	226 (56.5%)
	Frequently (>30%)	136 (34%)
What are the main challenges you face in diagnosing or managing H. pylori?	**Lack of access to reliable diagnostic tests**	74 (18.5%)
	Antibiotic resistance	147 (36.75%)
	Patient non- compliance	179 (44.75%)
	Other	0 (0%)

A significant portion of healthcare physicians (28%) believed that all individuals with mild dyspepsia symptoms should receive treatment for H. pylori, while (41.5%) healthcare physicians recommend treatment for patients diagnosed with gastric or duodenal ulcers. (30.5%) healthcare physicians supported treating every asymptomatic person who tests positive for H. pylori.

The majority of healthcare physicians (83%) prefered prescribing triple therapy (PPI + 2 antibiotics) as the first-line treatment regimen, while 17% of healthcare physicians prefered for quadruple therapy (PPI + 2 antibiotics + bismuth). (39.25%) of healthcare physicians decided the choice of antibiotics on cost and availability, (29.75%) of healthcare physicians decided on patient's previous antibiotic exposure and

(26.25%) of healthcare physicians decided on local antibiotic resistance patterns.

(67.25%) healthcare physicians indicated eradication therapy was 14 days, (16.25%) healthcare physicians indicated eradication therapy was 7 days and (13.25%) healthcare physicians indicated eradication therapy was 20 days (49.5%) most of healthcare physicians chose 2 weeks after cessation of therapy as timing of post-treatment diagnostic tests to confirm eradication varies and (37.25%) of healthcare physicians chose 4 weeks and only 13.25 of healthcare physicians chose 2 days after cessation.

352 (88%) physicians consider patient adherence a major challenge in H. pylori treatment.

56.5% of healthcare physicians occured occasionally (10-30%), and 34% of healthcare physicians occured frequently (>30%).

(44.75%) healthcare physicians believed that patient non-compliance is the most common challenge face in diagnosing or managing H. pylori, followed by (36.75%) healthcare physicians believed that antibiotic resistance is the most common challenge face in diagnosing or managing H. pylori and (18.5%) healthcare physicians believed that lack of access to reliable diagnostic tests is the most common challenge face in diagnosing or managing H. pylori.

Table 4: Knowledge assessment of the studied physicians

		N=400
Knowledge assessment	**Good knowledge**	264 (66%)
	Unsatisfactory knowledge	122 (30.5%)
	Poor knowledge	14 (3.5%)

Regarding knowledge assessment, 264 (66%) physicians was good knowledge, 122 (30.5%) physicians was unsatisfactory knowledge, and 14 (3.5%) physicians was poor knowledge.
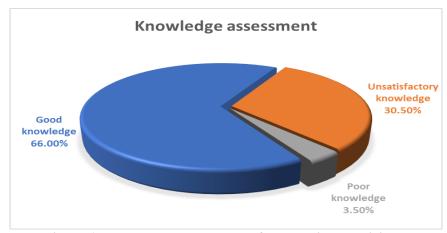

Figure 1: Knowledge assessment of the studied physicians

Table 5: Practice score assessment of the studied physicians

		N=400
Practice score	**Satisfactory practice**	**283 (70.75%)**
	Unsatisfactory practice	**117 (29.25%)**

Regarding practice score assessment, 283 (70.75%) physicians was satisfactory practice, and 117 (29.25%) physicians was unsatisfactory practice.

Figure 2: Practice score assessment of the studied physicians

Discussion

The gram-negative bacterium Helicobacter pylori settles within human stomach tissues to trigger various health complications ranging from chronic gastritis to peptic ulcer and gastric adenocarcinoma as well as mucosa-associated lymphoid tissue lymphoma. According to estimated statistics about fifty percent of the entire human population carries this bacterial infection. Yet the numbers of reported cases show higher rates in developing nations as opposed to developed nations.[9 -10] European population data shows that 20% to 40% of persons carry H. pylori . [11]

H. pylori infection strongly contributes to the development of gastric cancer and gastric lymphoma (MALT- mucosa-associated lymphoid tissue) because it causes such cancers . [12]

 Patients suffer from long-lasting bloating and nausea along with weight loss and appetite loss and face malnutrition and heartburn and indigestion. Bacterial infection of H. pylori leads to stomach lining atrophic inflammation that results in multiple adverse effects on gastric function. [13] Above stomach symptoms arise because of H. pylori infection. [14] Research has linked the severity of psoriasis to H. pylori infection yet scientists have proven that complete infection elimination leads to significant rosacea skin condition improvement[15.16]

Management of H. pylori infection serves as an essential clinical practice which combines specialist medical expertise with primary care delivery though the diagnosis tests require special scrutiny and therapy resistance to antibiotics remains critical. [17] Clinical diagnosis together with treatment decisions follow guidelines from both the Maastricht V/Florence Consensus Report. Both H. pylori diagnosis methods include stool antigen testing along with urea breath tests.

Standard treatment requires a combination between proton pump inhibitors and known antibiotics. It is more effective to treat H. pylori infection with a 10–14 day regime rather than a 7-day treatment course. [18]

A high prevalence of gastrointestinal diseases or symptoms (dyspeptic symptoms) indicates that many people receive primary health care when H. pylori infection rates are elevated. Primary care physicians need complete understanding to select proper treatment options which stops the delivery of ineffective services and associated increased expenditures to the population. Other countries initiate educational programs to train their primary care physicians about treating H. pylori but developing country surveys show healthcare providers still lack clarity about how H. pylori functions and how to diagnose and treat the infection. [19, 20].

 A Peruvian study showed that up to 60% of primary care physicians and 69% of internists used inappropriate regimens for eradicating H. pylori and that only 8% knew this infection was associated with MALT lymphomas. [21]

Therefore, this study aimed to determine the knowledge and practice of primary healthcare physicians at Sohag health care units concerning H. Pylori infection.

This cross-sectional study was carried out on 400 primary healthcare physicians admitted to Health Care Units of Sohag Governorate, Sohag, Egypt, in the duration from October 2024 to December 2024.

Our results revealed that the age of 323 (80.75%) physicians ranged from 20 to 30 years and 77 (19.25%) physicians ranged from 30 to 40 years. 272 (68%) physicians were general practitioners, followed by 128 (32%) physicians were family

physicians. Years of experience was (0-2) years in 177 (44.25%) physicians, (3-5) years was 168 (42%) physicians, and >5 years in 55 (13.75%) physicians.

Similarly, our findings were in line with **Hakami et al.,** [22] who assessed the knowledge and awareness of physicians of different specialties who practice in Saudi Arabia about H. pylori infection. Also, our results agreed with **Tazinkeng et al.,** [23] who sought to assess the knowledge and practices of primary care physicians (PCPs) in the diagnosis and management of *Helicobacter pylori* infection (HPI) in Cameroon. This study reported that the majority of physicians (97.75%) correctly identified H. pylori as a type of bacteria, very few of physicians (2.25%) were incorrectly identified it as parasite. A large portion of physicians (35.5%) believed the prevalence of H. pylori infection in their community was greater than 60% and 33.25% physicians believed the prevalence of H. pylori infection in their community was 20-40%. A large portion of physicians (73.25%) believed the H. pylori was transmitted through contaminated food or water and (31.5%) physicians believed close contact with an infected person plays a role, and a minor of physicians (26.75%) believed that poor hygiene could be a transmission vector. Nearly all respondents (94%) correctly identified the stomach as the primary location where H. pylori infects and only (4%) of physicians mentioning the lungs and (1.75%) of physicians chose intestines.

We found that most of physicians (82.25%) were aware of the link between H. pylori and peptic ulcers followed by (55.25%) physicians were aware of the association with chronic gastritis and (42%) physicians were aware of the link between H. pylori and gastric cancer. Less than half of healthcare physicians (40.75%) prefer using the stool antigen test, (25.5%) of healthcare physicians prefer using urea breath test as gold standard when testing for H. Pylori infection. Nearly half of healthcare physicians (49.25%) commonly used the stool antigen test to confirm H. pylori infection followed by (18%%) of physicians used serological tests. 274 (68.5%) physicians tested patients for eradication success post-treatment, which was essential for ensuring that the infection has been cleared. 203 (50.75%) healthcare physicians believed in stopping

antibiotics for at least 4 weeks before testing for H. pylori with others (40.75%) and (18.75%) healthcare physicians recommended stopping proton pump inhibitors (PPI) for varying lengths of time.

The results of this study supported Hakami et al. [22] after they demonstrated that 91.6% of participants recognized H. pylori as the bacterium which causes stomach ulcers showing that surveyed participants possessed adequate H. pylori infection knowledge. Contrary to other studies half of all participants believed that socio-economic status plays a part in H. pylori infection yet almost nine out of ten individuals were aware of hand washing acting as prevention. The choice for testing infection diagnosis revealed that 87.8% favored the urea breath test but participants selected the stool antigen test to confirm H. pylori presence. H. pylori infection stands as the main factor behind stomach cancer according to 88.4% of participants because these bacteria affect the stomach lining and produce harmful substances that harm cells..

Also, this study was in line with **Liu et al.,** [24] who aimed to investigate the current state of knowledge and practices concerning H. pylori infection management among physicians in Gansu Province, northwest China. They reported that 43.2% of the physicians supported H. pylori screening for high-risk populations or individuals with H. pylori-related diseases. The awareness of target screening populations varied among these physicians, ranging from 69.6% to 98.2%. Most physicians preferred the urea breath test (UBT) as the method for diagnosing H. pylori infection (98.3%) and for follow-up after eradication therapy (98.5%).

As well, our findings agreed with **Ahmed et al.,** [25] who assessed the knowledge and practices of primary care physicians in diagnosis and management of Helicobacter pylori (H. pylori) infection in developing country. They reported that 78% of the physicians thought that contaminated water was the source of spread of infection, dyspepsia was the most frequent indication for investigating H. pylori infection (67% of the physicians), while 43% physicians demonstrated that serology was the most appropriate test to diagnose active H. pylori infection.

Furthermore, our results were concordant with **Song et al.,** [26] who investigated the current state

of knowledge and practice of Helicobacter pylori (H. pylori) infection management in China..Our results showed that a significant portion of healthcare physicians (28%) believed that all individuals with mild dyspepsia symptoms should receive treatment for H. pylori, while (41.5%) healthcare physicians recommend treatment for patients diagnosed with gastric or duodenal ulcers. (30.5%) healthcare physicians supported treating every asymptomatic person who tests positive for H. pylori.

In a study involving 509 primary care physicians, **Ahmed et al.,** [27] reported that 328 (77%) primary care physicians thought that gastric ulcer was the most compelling indication for the H. pylori treatment.

This study reported that the majority of healthcare physicians (83%) preferred prescribing triple therapy (PPI + 2 antibiotics) as the first-line treatment regimen, while 17% of healthcare physicians preferred for quadruple therapy (PPI + 2 antibiotics + bismuth). (39.25%) of healthcare physicians decided the choice of antibiotics on cost and availability, (29.75%) of healthcare physicians decided on patient's previous antibiotic exposure and (26.25%) of healthcare physicians decided on local antibiotic resistance patterns. (67.25%) healthcare physicians indicated eradication therapy was 14 days, (16.25%) healthcare physicians indicated eradication therapy was 7 days and (13.25%) healthcare physicians indicated eradication therapy was 20 days (49.5%) most of healthcare physicians chose 2 weeks after cessation of therapy as timing of post-treatment diagnostic tests to confirm eradication 15 varies and (37.25%) of healthcare physicians chose 4 weeks and only 13.25 of healthcare physicians chose 2 days after cessation. In harmony with our results, **Al-Dubai et al.,** [28] assessed the level of knowledge, attitudes and practices regarding H. pylori infection diagnosis and treatment among Primary Health Care Physicians in Al-Madinah, Saudi Arabia. The study revealed that H. pylori eradication standard therapy was quadruple therapy in 25% of cases while triple therapy using clarithromycin stood at 91%. The participating physicians indicated that 73 percent of them used H. pylori treatments for 14 days. The majority of participants used 20 mg of medication twice per day or took 40 mg daily (patients represented 65% of the survey group). The practitioners indicated two options for

treatment failure : 27% would keep the current protocol but use different antibiotics whereas 43% would switch to another treatment approach.

Also, our findings agreed with **Tazinkeng et al.,** [23] who demonstrated that the most frequently used first-line therapies were amoxicillin (AMX), clarithromycin (CLA), metronidazole (MNZ) and proton pump inhibitor (PPI) concomitant therapy (32.2%), AMX–CLA–PPI triple therapy (18.6%) and AMX–MNZ–PPI triple therapy (13.1%). at least fourteen days before performing the examination..

On the other hand, **Liu et al.,** [24] reported that 89.6% of the physicians preferred bismuth-containing quadruple therapy for initial eradication, with amoxicillin and clarithromycin being the most commonly used antibiotic combination (56.3%). In addition, 84.6% of the physicians indicated that they would inquire about the antibiotic usage history for most patients before treatment, 93.8% would ask patients about their previous eradication history, and 94.2% would inform patients about treatment-related considerations. However, only 43.5%, 27.7%, and 29.7% of the physicians were aware of the high resistance rates of H. pylori to clarithromycin, levofloxacin, and metronidazole, respectively, in Gansu Province.

Recent evidence showed a remarkable decline in the success of H. pylori infection eradication with the use of clarithromycin-based triple therapy. [20] This decline can be attributed to several factors. However, the main reason for treatment failure is most likely the increase in clarithromycin resistance. [[29]

A study in Saudi Arabia conducted by **Eltahawy et al.,** [30] to explore H. pylori resistance to different antibiotics found that 80% of the isolates were resistant to metronidazole, 4% to clarithromycin, 1.3% to amoxicillin and 0.4% to tetracycline. [30] A more recent study by **Alsohaibani et al.,** [31] showed that clarithromycin resistance in H. pylori was 23%, whereas amoxicillin resistance was 15%. The observed rising levels of antibiotic resistance should be considered when selecting the most effective regimen against H. pylori infection in Saudi Arabia.

The American College of Gastroenterology Clinical Guideline for Treatment of Helicobacter pylori Infection strongly recommends the use of bismuth quadruple therapy as a first-line regimen

in regions with a high rate (>15%) of clarithromycin resistance . [32]

Our findings demonstrated that 352 (88%) physicians consider patient adherence a major challenge in H. pylori treatment. 56.5% of healthcare physicians revealed that treatment failure occurred occasionally (10-30%), and 34% of healthcare physicians occurred frequently (>30%). (44.75%) healthcare physicians believed that patient non-compliance was the most common challenge face in diagnosing or managing H. pylori, followed by (36.75%) antibiotic resistance and (18.5%) lack of access to reliable diagnostic tests.

Similarly, our results were consistent with **Al-Dubai et al.,** who found that the most common reasons of treatment failure, reported by the participants, were antibiotic resistance (68%) and poor adherence from the patients (71%). Most medical therapies require high adherence to achieve successful outcomes. Resistance of the pathogen to antibiotics is increasing globally, with a concomitant decline in the eradication rate. [32]

Regarding knowledge assessment, our results showed that 264 physicians (66%) demonstrated good knowledge of *H. pylori* infection, while 122 physicians (30.5%) exhibited unsatisfactory knowledge, and 14 physicians (3.5%) displayed poor knowledge. Regarding clinical practice, 283 physicians (70.75%) achieved a satisfactory practice score, whereas 117 physicians (29.25%) had unsatisfactory practice levels.

In agreement with our findings, **Hakami et al.,** revealed that the average *H. pylori* awareness of the physicians who participated scored 76.99± 6.9. This indicated that most surveyed participants had sufficient knowledge of *H. pylori* infection.

Regarding the practice of *H. pylori*, their results showed that most participants know how to manage the infection. [22].

This was in contrast to the previous survey study by **Song et al.,** who reported that the evaluation of the knowledge, attitude, and practice regarding *H. pylori* among general practitioners showed a lack of updated knowledge and variable practices deviating from the guidelines in term of diagnostic testing, accurate therapeutic approaches and confirmation of eradication. [33]

Conclusion

The common health issue of Helicobacter pylori infection demands primary healthcare interventions particularly in Sohag Governorate's limited resource zones. The study showed that primary healthcare physicians displayed different levels of knowledge and practice performance in preventing infections. A few areas of cognitive and behavioral practice demonstrated weaknesses especially in understanding transmission methods together with preventing H. pylori and delivering patient health education.

The fight against H. pylori requires primary healthcare physicians to play a central role because this approach will simultaneously reduce infection-related health problems and enhance community service quality in Sohag Governorate thereby creating beneficial effects for public health during long-term periods.

Data shows the importance of developing continuous medical training which provides primary care physicians with most recent guidelines to manage H. pylori infection. Relevant health entities must develop strategies to embed both healthcare prevention practices and education standards into physician routines and build systems which support correct health standard execution.

References

1. **Santos MLC, de Brito BB, da Silva FAF, Sampaio MM, Marques HS, e Silva NO, et al.** Helicobacter pylori infection: Beyond gastric manifestations. World J Gastroenterol. 2020;26(28):4076-82.

2. **Dore MP and Graham DY**. Modern approach to the diagnosis of helicobacter pylori infection. Aliment Pharmacol Ther 2022;55(1):14-21.

3. **Malfertheiner P, Camargo MC, El-Omar E, Liou JM, Peek R, Schulz C, et al.** Helicobacter pylori infection. Nat Rev Dis Primers. 2023;9(1):19-27.

4. **Al-Eraky DM, Helmy OM, Ragab YM, Abdul-Khalek Z, El-Seidi EA and Ramadan MA**. Prevalence of CagA and antimicrobial sensitivity of H. pylori isolates of patients with gastric cancer in Egypt. Infect Agents Cancer. 2018;13(1):24-33.

5. **Metwally M, Ragab R, Abdel Hamid HS, Emara N and Elkholy H**. Helicobacter pylori antibiotic resistance in Egypt: A single-center study. Infect Drug Resist. 2022;15:5905-13.

6. **Elbehiry A, Abalkhail A, Anajirih N, Alkhamisi F, Aldamegh M, Alramzi A, et al.** Helicobacter pylori: Routes of infection, antimicrobial resistance,

and alternative therapies as a means to develop infection control. Dis J. 2024;12(12):311-9.

7. **Kotilea K, Bontems P and Touati E**. Epidemiology, diagnosis and risk factors of helicobacter pylori infection. In: Shigeru Kamiya SB, editor. Helicobacter pylori in Human Diseases: Advances in Microbiology, Infectious Diseases and Public Health Volume 112019. p. 17-33.

8. **Mehata S, Parajuli KR, Pant ND, Rayamajhee B, Yadav UN, Mehta RK, et al.** Prevalence and correlates of helicobacter pylori infection among under-five children, adolescent and non-pregnant women in nepal: Further analysis of nepal national micronutrient status survey 2016. PLoS Negl Trop Dis. 2021;15(6):95-101.

9. **Thung I, Aramin H, Vavinskaya V, Gupta S, Park JY, Crowe SE, et al.** the global emergence of Helicobacter pylori antibiotic resistance. Aliment Pharmacol Ther. 2016;43(4):514–33 .

10. **Zamani M, Ebrahimtabar F, Zamani V, Miller WH, Alizadeh-Navaei R, Shokri-Shirvani J, et al.** Systematic review with meta-analysis: the worldwide prevalence of Helicobacter pylori infection. Aliment Pharmacol Ther. 2018;47(7):868–76 .

11. **O'Connor A, O'Moráin C.** Helicobacter pylori infection in Europe: current perspectives. Expert Rev Gastroenterol Hepatol. 2013;7(6):541–8 .

12. **Yang JC, Lu CW, Lin CJ**. Treatment of Helicobacter pylori infection: current status and future concepts. World J Gastroenterol WJG. 2014;20(18):5283 .

13. **Serena S, Michele R, Chiara M, Gioacchino L, Lorella F, Tiziana M, et al**. Relationship between Helicobacter pylori infection and GERD. Acta Bio Medica Atenei Parm. 2018;89(Suppl 8):40 .

14. **Gravina AG, Zagari RM, De Musis C, Romano L, Loguercio C, Romano M.** Helicobacter pylori and extragastric diseases: A review. World J Gastroenterol. 2018;24(29):3204 .

15. **Gravina AG, Federico A, Ruocco E, Lo Schiavo A, Masarone M, Tuccillo C, et al.** Helicobacter pylori infection but not small intestinal bacterial overgrowth may play a pathogenic role in rosacea. United Eur Gastroenterol J. 2015;3(1):17–24 .

16. **Mesquita PMD, Diogo A, Jorge MT, Berbert ALCV, Mantese SA de O, Rodrigues JJ.** Relationship of Helicobacter pylori seroprevalence with the occurrence and severity of psoriasis. An Bras Dermatol. 2017;92:52–7 .

17. **Malfertheiner P, Camargo MC, El-Omar E, Liou JM, Peek R, Schulz C, et al.** Helicobacter pylori infection. Nat Rev Dis Prim. 2023;9(1):19 .

18. **Malfertheiner P, Mégraud F, O'Morain CA, Gisbert JP, Kuipers EJ, Axon AT, et al.** Management of Helicobacter pylori infection—the Maastricht V/Florence consensus report. Gut. 2017;66(1):6–30 .

19. **Ghanaei FM, Joukar F, Soati F, Gharib S.** Knowledge and practice of general practitioners and internists about Helicobacter pylori infection in Guilan, Iran. Middle East J Dig Dis. 2011;3(2):119 .

20. **Cano-Contreras AD, Rascón O, Amieva-Balmori M, Rios-Galvez S, Maza YJ, Meixueiro-Daza A, et al.** Approach, attitudes, and knowledge of general practitioners in relation to Helicobacter pylori is inadequate. There is much room for improvement! Rev Gastroenterol México (English Ed. 2018;83(1):16–24 .

21. **Teves M, JI SM, ZI GE.** The physician's attitude towards infection by Helicobacter pylori in clinical practice. Rev Gastroenterol del Peru Organo Of la Soc Gastroenterol del Peru. 2002;22(3):221–7 .

22. **Hakami OA, Alsubaie RA, Albaqami BA, Almutlaq HM, Alqahtani NM, Alkhonezan M, et al.** Knowledge and perception of Physicians of different specialties in Saudi Arabia toward Helicobacter pylori. J Multidiscip Healthc. 2023;763–71 .

23. **Tazinkeng N, Monteiro JF, Mbianyor BE, Nowbuth AA, Ntonifor M, Evenge C, et al.** Knowledge and approach towards Helicobacter pylori diagnosis and management among primary care physicians in Cameroon: a cross-sectional study. Trans R Soc Trop Med Hyg. 2024;118(5):313–20 .

24. **Liu N, Luo Q, Gou L, Shen X, Zhang D**. Knowledge and Practices of Helicobacter pylori Infection Management Among Physicians in Gansu Province, China: A Cross-Sectional Study. Helicobacter. 2024;29(5):e13137 .

25. **Ahmed S, Salih M, Jafri W, Ali Shah H, Hamid S**. Helicobacter pylori infection: approach of primary care physicians in a developing country. BMC Gastroenterol. 2009;9:1–6 .

26. **Song Z, Chen Y, Lu H, Zeng Z, Wang W, Liu X, et al.** Diagnosis and treatment of Helicobacter

===

pylori infection by physicians in China: a nationwide cross-sectional study. Helicobacter. 2022;27(3):e12889.

27. **Al-Dubai SAR, Alharbi OA, Tolah HW.** Adequacy of practice regarding Helicobacter pylori eradication in Al-Madinah, Kingdom of Saudi Arabia: a cross-sectional study. Med Sci. 2022;26:ms546e2623 .

28. **Jung HK, Kang SJ, Lee YC, Yang HJ, Park SY, Shin CM, et al.** Evidence-based guidelines for the treatment of Helicobacter pylori infection in Korea: 2020 revised edition. Korean J Helicobacter Up Gastrointest Res. 2020;20(4):261–87

.

29. K**im SangGyun KS, Jung HyeKyung JH, Lee HangLak LH, Jang JaeYoung JJ, Lee Hyuk LH, Kim ChanGyoo KC, et al.** Guidelines for the diagnosis and treatment of Helicobacter pylori infection in Korea, 2013 revised edition. 2014؛

30. **Eltahawy AT.** Prevalence of primary Helicobacter pylori resistance to several antimicrobials in a Saudi Teaching Hospital. Med Princ Pract. 2002;11(2):65–8 .

31. **Alsohaibani F, Al Ashgar H, Al Kahtani K, Kagevi I, Peedikayil M, Alfadda A, et al.** Prospective trial in Saudi Arabia comparing the 14-day standard triple therapy with the 10-day sequential therapy for treatment of Helicobacter pylori infection. Saudi J Gastroenterol. 2015;21(4):220–5 .

32. **Chey WD, Leontiadis GI, Howden CW, Moss SF.** ACG clinical guideline: treatment of Helicobacter pylori infection. Off J Am Coll Gastroenterol ACG. 2017;112(2):212.

33. **Song C, Xie C, Zhu Y, Liu W, Zhang G, He S, Zheng P, et al.** Management of Helicobacter pylori infection by clinicians: a nationwide survey in a developing country. Helicobacter. 2019 Dec;24(6):e12656