

## The Efficacy of Health Literacy sessions regarding Helicobacter Pylori Infection on University Students' Knowledge and Practices: Sustainability Health, Egypt 2030

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### Abstract

**Background:** Helicobacter pylori (H. pylori) infection, a Gram-negative bacterium, causes gastrointestinal symptoms and severe complications after invading gastric mucosa. As the infection could be asymptomatic, it is crucial to enhance knowledge and practices of individuals for prevention of infection. **Aim:** This study aims to evaluate the efficacy of health literacy sessions regarding helicobacter pylori on students' knowledge and practices. **Subject and Methods:** A quasi-experimental study examined a convenient sample of 157 students at Damietta University hostels. The data were collected via two tools; tool I: students' characteristics tool and tool II: structured questionnaire (pre- and post-assessment). **Results:** There was a statistically significant difference in the overall mean scores of students' knowledge and practices between pre- and post-implementation of health literacy sessions ( $t = 15.365$ ,  $P = 0.000$ ); ( $t = 13.763$ ,  $P = 0.001$ ) respectively. Moreover, there was a statistically significant positive correlations between students' knowledge and practices through program phases. **Conclusions and Recommendations:** Screening of H. pylori for early detection should be applicable for most of the population. Furthermore, mass media awareness campaigns should be launched about preventive measures of H. pylori, and annual check-ups should be organized.

**Key words:** health literacy sessions; helicobacter pylori; university students; knowledge; practices

### Introduction

Helicobacter pylori (H. pylori) infection, one of the leading chronic bacterial infections in humans (Saleem & Howden,

2020), is caused by a Gram-negative bacterium that harbors the gastric mucosa and affects nearly four billion people globally (Mahmoud et al., 2020). The prevalence of H. pylori infection varies widely among the Middle East and North African countries ranging from 7% to 50% in young children and up to 36.8% to 94% in adults (Alsulaimany et al., 2020).

Most H. pylori infections are asymptomatic and have no clinical manifestations, especially in low-income communities. However, the signs and symptoms of the disease are primarily caused by gastric or peptic ulcer illness or duodenal inflammation. Other symptoms, such as nausea, vomiting, and abdominal pain, could also be caused by other gastrointestinal diseases (Abbas et al., 2018).

The acquisition and spread of H. pylori infection remain debatable to date. The

primary route of infection transmission appears to be through direct person-to-person transmission (oral-oral, gastro-oral, fecal-oral, breastfeeding, and iatrogenic pathways). Moreover, waterborne, zoonotic, milk ingestion-based, and raw vegetable-based transmission routes have also been investigated earlier, and each route requires a contaminated intermediate environmental reservoir (**Mezmale, Coelho, Bordin, & Leja, 2020**).

*H. pylori* infection is associated with risk factors, including demographics, socioeconomic status, environmental and sanitation factors, household properties, geographic locations, dietary and lifestyle habits (**Mezmale et al., 2021**).

The infection rates are reportedly higher in a low socioeconomic group, and this relationship is even more apparent in the developing countries. Furthermore, parents' educational level and increased numbers of siblings, condition of water sources, drinking alcohol, presence/absence of sewage system, and garbage collection correlate with the living conditions and could be potential risk factors for *H. pylori* infection (**Ozbey & Hanafiah, 2017; Wang et al., 2019**).

Invasive and noninvasive tests used to detect *H. pylori* infection include the rapid urease test, microbiological culture, histology, and polymerase chain reaction, in which esophagogastroduodenoscopy (OGDS) is required to obtain a stomach biopsy. Meanwhile noninvasive methods comprise the stool antigen test, urea breath test, and blood test for *H. pylori* antigens or anti-*H. pylori* antibody detection (**Ozbey & Hanafiah, 2017**).

*H. pylori* infection contributes to peptic ulcers occurrence (gastric and duodenal), chronic gastritis, gastric mucosa-associated lymphoid tissue lymphoma, and gastric cancer (**Altamimi et al., 2020; Saleem &**

**Howden, 2020**), as well as iron-deficiency anemia (**Kato et al., 2019**).

It is imperative to prevent or to avoid severe complications of *H. pylori* infection through installing safe water supplies and training parents, especially mothers and grandmothers, about sanitation rules. Moreover, participating in a "screen/therapy/follow-up for recurrence" program which should be mandatory for adults with gastrointestinal problems. Besides, hand washing, eating properly prepared food, and drinking water from a safe and clean source are essential steps in preventing *H. pylori* infection. Although breastfeeding keeps children healthy, washing hands before breastfeeding and preparing food is a simple and effective way to prevent household contamination (**Yucel, 2014**).

As universal and high-quality healthcare system are capable of improving health conditions through early intervention, and preventive coverage, Egypt Vision 2030 focuses on improving the quality of life of the Egyptian citizens. This can lead to eradicate the epidemics diseases, including water-borne illness and other communicable diseases, as well as protection of the vulnerable population (**United Nations Egypt, 2022**).

Good health and well-being are basic human rights and essential for a stronger society. Despite limited financial resources, population increase and the necessity for better governance, Egypt aims to improve health services. The ministry of health set strategic goals to be accomplished by 2030. Firstly, improve citizens' health by delivering and strengthening primary healthcare through education and application of preventive measures. Moreover, to establish universal access to comprehensive healthcare for all citizens. These efforts help achieve sustainable health (**Rayan, 2019**).

### Significance of the study

*H. pylori* infection could be asymptomatic and contributed to severe complications. Gastric cancer, one of these complications, is the fifth most commonly diagnosed and the seventh most prevalent disease globally (Rawla & Barsouk, 2019). *H. pylori* infection pose a serious challenge to human health. As prevention is better than cure, raising health awareness to prevent *H. pylori* infection is of the key roles of nursing.

### Operational definition

#### Health literacy sessions:

Sessions on health literacy assist participants in finding, reading, comprehending, and using information concerning healthcare in order to make wise health decisions and follow recommended treatment protocols.

### Aim of the study

To evaluate the efficacy of health literacy sessions regarding helicobacter pylori on students' knowledge and practices.

### Research hypothesis

**H1:** University students have a satisfactory level of knowledge regarding prevention of *H. pylori* infection after implementing the health literacy sessions.

**H2:** University students have competent practices regarding prevention of *H. pylori* infection after implementing the health literacy sessions.

### Subject and Methods

#### Research design

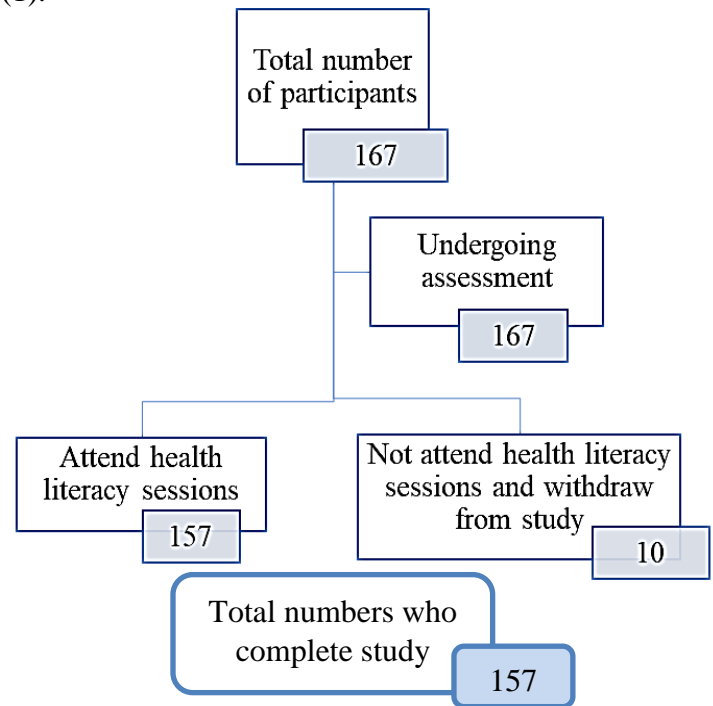
A quasi-experimental research design, with pre- and post-assessment.

#### Setting

The Students' University Hostels, Damietta University, New Damietta, Egypt.

#### Subjects

A convenient sample of 157 students at university hostels, who participated in the assessment and attended the health literacy sessions during the period from November 2020 to April 2021 as illustrated in figure (1).



**Figure 1. Flow chart of study participants through each stage of the study**

### Data collection tools

The following two tools were developed by the researchers for data collection:

**Tool I: Students' characteristics tool.** It comprised two parts:

**First Part:** It incorporates the following items:

- Students' demographic characteristics, including age, gender, faculty type, and food source.
- Sociodemographic characteristics of their parents, including parents' age, education, occupation, residence, number of siblings, family numbers, family income, number of rooms, home sanitation, and source of information at home.

**Second Part:** It consisted of family medical history as the following:

- A) Genetic diseases and family history for gastric problems and gastrointestinal diseases
- B) Family history of *H. pylori* infection

**Tool II: Structured Questionnaire (pre- and post-assessment).** Based on the literature review (O'Connor, O'morain, & Ford, 2017; El-Kady, 2018; Aitila et al., 2019; Kato et al., 2019), and translated into simple Arabic language. It included data related to students' level of knowledge and practices toward *H. pylori* infection, including definition, causes, types of *H. pylori*, signs and symptoms, investigations, diagnosis, awareness of mode of transmission, prevention, and treatment. Furthermore, dietary habits included drinking coffee, tea, eating spicy foods, eating raw vegetables, and skipping meals. Moreover, administering medications received or prescribed by the physician, including corticosteroids, antidepressants, thyroid drugs, anticoagulants, and peptic ulcer drugs.

### Scoring system

#### Knowledge questionnaire (11 items):

Each item was scored either for incorrect answer (zero mark) or correct answer (one). The scores of the items were summed up and ranged from zero to eleven. Knowledge scores were considered either satisfactory (if  $\geq 60\%$ ) or unsatisfactory (if  $< 60\%$ ).

#### Practices questionnaire (54 items):

Each item was scored for not done (zero mark) or done (one). The scores of the items were summed up and ranged from zero to fifty-four. In addition, the level of practice was considered either competent (if  $\geq 60\%$ ) or incompetent (if  $< 60\%$ ).

**Content validity and reliability:** Tools were submitted to a panel of five experts—

one in the field of community health nursing, one in community health medicine, one in maternal and newborn health nursing, and two in medical-surgical nursing. In addition, modifications were formulated. The reliability was estimated using Cronbach  $\alpha$  coefficients, which ranged from 0.84 (perceived severity) to 0.98 (cues to action).

### Ethical considerations

Ethical approval for the study implementation was obtained from the faculty of nursing, Damietta university. A formal letter from the dean of the faculty of nursing, Damietta university, was directed to the director of university students' hostels, informing about the study. Then, the aim of the study was explained to directors and supervisors at each student's university hostel. In addition, the aim and confidentiality of the study were explained to every participant and informed consent was obtained before starting the sessions. In addition, participants were informed about their rights to withdraw from the study at any time. This study was funded by the projects funding and granting unit through the scientific research development unit at Damietta university.

**Pilot study:** It was conducted with 10% of students (16 student) to test the feasibility of study tools and time allocated for implementing the health literacy sessions. Of note, the pilot study sample was excluded from the final study sample.

### Data collection:

Data collection was performed in the academic year 2020–2021 from November, 2020 to April 2021. The researchers attended the students' university hostels from 6.00 p.m. to 10.00 p.m. for 2 days/week.

**Preparatory phase:**

It involved reviewing the literature, different studies, and gaining theoretical knowledge about various aspects of the study issues. After developing the tools and obtaining permissions for implementing of the study, the researchers introduced themselves to students who agreed to participate and explained the study aim and objectives at the study settings. Then, the students answered the questionnaire, which took about 15–20 minutes to fill (the pre-assessment stage).

**Implementation phase (Health literacy sessions):**

An instructional booklet was developed by the researchers based on the students' needs after analyzing the pre-assessment stage and as well as on the literature review (Ayala et al., 2014; Takeuchi et al., 2014; Wang et al., 2015; Alborai et al., 2019). The booklet distributed among students at the beginning of the program. It included the definition of *H. pylori* infection, causes, risk factors, signs and symptoms, mode of transmission of infection, complications, diagnosis, treatment, including best and worst food for patients with *H. pylori* infection, and preventive measures. The researchers used simple and clear Arabic language to illustrate pictures to the students.

The health literacy sessions were categorized into six sessions. Program orientation and its purpose were held at the beginning of the first session, and the participants were informed about the time and place of the subsequent sessions. Each session started with a summary of the previous session(s) and the objectives of a new one. The researchers used simple words that suited each student. The duration of each session was about 1–1.10 hour daily,

including time of discussion but excluding pre- and posttests.

**Evaluation phase:**

Evaluation was done by comparing the changes in the students' level of knowledge and practices through pre- and immediate post-implementation of the health literacy sessions. The program ran for six months, including one month for pretest, four months for implementation of health literacy sessions, and one for immediate posttest after the program implementation.

**Statistical analysis**

Data entry and statistical analysis were performed using statistical package for social sciences (SPSS version 20.0.) for descriptive statistics in the form of frequencies and percentages ( $N$  and %) for categorical variables. Means and standard deviations were used for continuous variables. Pearson correlation coefficient was used for measuring the correlation between continuous variables. Chi square tests ( $\chi^2$ ) were used for correlating categorical variables. Furthermore, dependent sample  $t$ -test was used for analyzing differences between scores. Significance level was set at ( $P < 0.05$ ).

**Results**

Table 1 showed that about half of the students (49%) were among 20–22 years old, and two-thirds (72%) were females. Students equally came from medical and non-medical fields. Besides, two-thirds of students (71.4%) had home-cooked food. Regarding the previous diagnosis of *H. pylori*, most students (84%) exhibited a positive diagnosis with treatment (82.1%). Furthermore, over two-thirds of participants (73.9%) sourced information from the Facebook.

Table 2 revealed that over two-thirds (65.6%) of students were from rural areas, 59.9% had 2–3 siblings, and 75.2% had 5–7 total number of family members. Nearly two-thirds of participants (64.3%) stated that their income was barely enough for the family. The majority of participants (75.1%) revealed that their houses were crowded.

Table 3 illustrated that the overall mean score of students' levels of knowledge before the program ( $3.42 \pm 1.16$ ) was lower than that after program implementation ( $8.71 \pm 2.76$ ). The difference in the overall mean scores of students' knowledge was statistically significant ( $t = 15.365$ ,  $P = 0.000$ ). Regarding students' practices, the overall mean score before the program ( $23.62 \pm 7.23$ ) was lower than that after program implementation ( $44.18 \pm 12.89$ ). The difference in the overall mean scores of students' practice was statistically significant ( $t = 13.763$ ,  $P = 0.001$ ).

Table 4 summarized the overall mean scores of students' practices subdimensions. For all subdimensions, the overall mean scores after program implementation were higher than before the program. The differences in the overall mean scores of students' practices subdimensions were statistically significant; with all p values were ( $P \leq 0.001$ ).

Figure (2) showed that most students (67.5%) had satisfactory levels of knowledge after the program implementation than before (13.4%). Regarding practices, most students (62.4 %) had competent practices after the program implementation than before (19.1%). Besides, these differences in knowledge and practice levels were statistically significant ( $X^2 = 11.66$ ,  $p = 0.001^{**}$ ); ( $X^2 = 22.32$ ,  $p = 0.000^{**}$ ) respectively.

Table 5 summarized statistically significant positive correlations between students' knowledge and practices through program phases ( $r = 0.56$ ,  $P = 0.001^{**}$ ) during pre-program implementation, and ( $r = 0.44$ ,  $P = 0.002^*$ ) during post-program implementation.

**Table 1. Frequency distribution of students regarding their demographic characteristics and medical history (*n* = 157)**

Students' demographic characteristics	<i>N</i>	%
<b>Age</b>		
▪ <20	72	45.9
▪ 20–22	77	49
▪ ≥22	8	5.1
<b>Mean ± SD 21.81 ± 3.54</b>		
<b>Gender</b>		
▪ Male	44	28
▪ Female	113	72
<b>Faculty</b>		
▪ Medical	80	50.9
▪ Non-medical	77	49.1
<b>Food Source</b>		
▪ Home	112	71.4
▪ Restaurant	20	12.7
▪ Street	5	3.2
▪ All	20	12.7
<b>Medical history (<i>H. pylori</i>)</b>		
<b>Pervious diagnosis:</b>		
▪ Yes	132	84
▪ No	25	16
<b>Previous treatment</b>		
▪ Yes	129	82.1
▪ No	28	17.9
<b>Source of students' information at home</b>		
▪ TV	41	26.1
▪ Facebook	116	73.9

**Table2:Frequency distribution of students' families regarding their sociodemographic characteristics ( $n = 157$ )**

Family characteristics	<i>N</i>	%
<b>Residence of family</b>		
▪ Rural	103	65.6
▪ Urban	54	34.4
<b>Number of siblings</b>		
▪ 1	13	8.3
▪ 2–3	94	59.9
▪ >3	50	31.8
<b>Family income</b>		
▪ Enough and save	43	27.4
▪ Barely enough	101	64.3
▪ Not enough	13	8.3
<b>Total family number</b>		
▪ 2–4	38	24.2
▪ 5–7	118	75.2
▪ >7	1	0.6
<b>Number of rooms</b>		
▪ 1	8	5.1
▪ 2	42	26.8
▪ 3	63	40.1
▪ >3	44	28
<b>Crowd index</b>		
▪ Not crowded	39	24.9
▪ Crowded	118	75.1



**Table 3. Total mean and standard deviation scores of students' knowledge and practice through program phases ( $n = 157$ )**

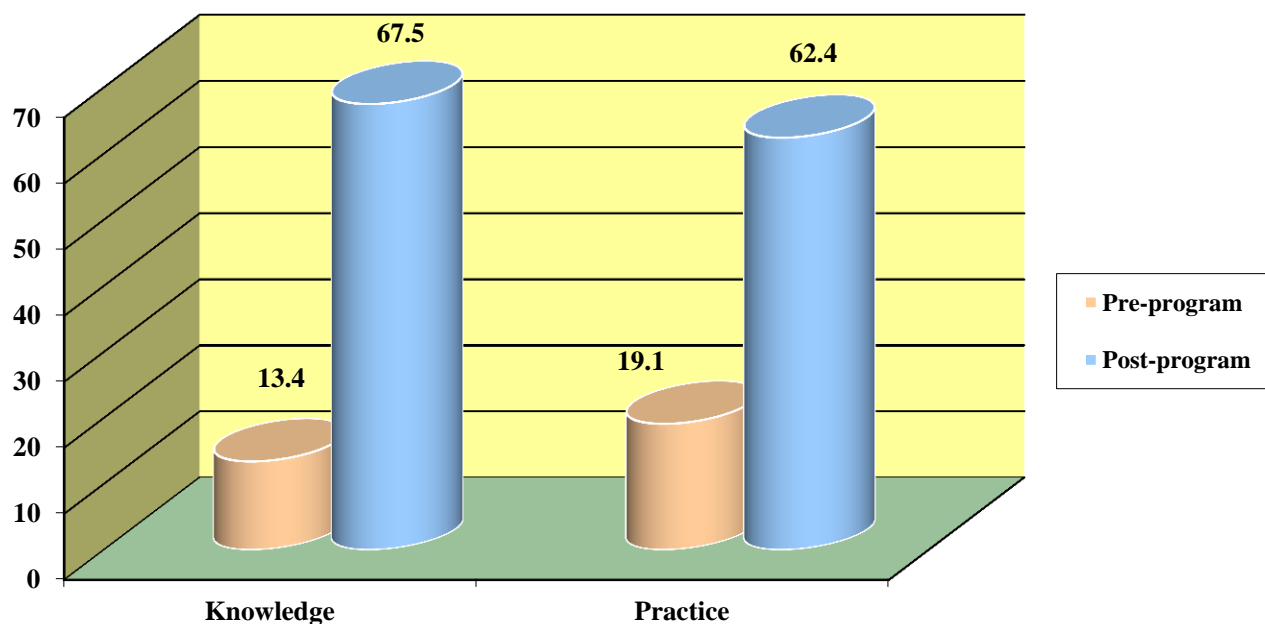
Items	Max Score	Pre	Post	<i>t</i> -value	<i>P</i>
		Mean $\pm$ SD	Mean $\pm$ SD		
Total knowledge	11	3.42 $\pm$ 1.16	8.71 $\pm$ 2.76	15.365	0.000**
Total practice	54	23.62 $\pm$ 7.23	44.18 $\pm$ 12.89	13.763	0.001**

\*\*A highly statistically significant difference ( $P \leq 0.001$ ).

**Table 4. Total mean and standard deviation scores of participants preventive practices subdimensions through program phases ( $n = 157$ )**

Preventive practices items	Max Score	Pre	Post	<i>t</i> -value	<i>P</i>
		Mean $\pm$ SD	Mean $\pm$ SD		
Hand hygiene	7	2.79 $\pm$ 0.56	5.87 $\pm$ 1.76	7.541	0.000**
Food selection	5	2.43 $\pm$ 0.76	4.54 $\pm$ 1.43	4.316	0.001**
Food preparation	14	5.87 $\pm$ 1.43	12.34 $\pm$ 3.65	7.864	0.001**
During cooking	5	2.51 $\pm$ 0.94	3.89 $\pm$ 0.94	3.062	0.001**
Food separation	4	1.88 $\pm$ 0.64	2.98 $\pm$ 0.51	5.683	0.000**
Food storage	10	4.36 $\pm$ 1.67	7.96 $\pm$ 2.45	6.415	0.000**
Personal hygiene	9	3.76 $\pm$ 1.33	6.65 $\pm$ 2.11	5.253	0.001**

\*\*A highly statistically significant difference ( $P \leq 0.001$ ).

**Figure 2. Students' knowledge and practice levels through program phases ( $n = 157$ ).**

**Table 5. Correlation between students' knowledge and preventive practices regarding H. pylori infection through program phases ( $n = 157$ )**

Items	Knowledge Level			
	Pre		Post	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
<b>Practice Level</b>	0.56	0.001**	0.44	0.002*

\*\*A highly statistically significant difference ( $P \leq 0.001$ ).

\*A statistically significant difference ( $P \leq 0.05$ ).

### **Discussion:**

H. pylori causes gastritis and it is a major cause of hypochlorhydria and plays a crucial role in the progression from gastritis to atrophy and finally to gastric cancer (Sheh & Fox, 2013; Suzuki & Mori, 2018). The current study evaluated health literacy sessions efficacy on students' knowledge and practices. Increase awareness of students toward importance of screening and prevention of H. pylori infection is essential as screening helped in the early detection and treatment of infection, enabling the eradication of peptic ulcer and gastric cancer, as reported by Ford, Yuan, and Moayyedi (2020), Liou et al. (2020), and Roderick et al. (2003).

A total of 157 students at university hostels were participated in the study. The total number of female participants were more than males because female students outnumber male students in the university hostels, which aligns with Adams et al., (2021), Moustafa Elpasiony et al., (2021), and Rafique et al., (2021). Conversely, male students accounted for two-thirds of participants in a study done by Algahtani et al. (2020) and Khan, Kamal, Illiyan, and Asif (2021).

Regarding the previous diagnosis of H. pylori infection, most students exhibited positive diagnosis and sought relevant treatment, and over two-thirds sourced related information from Facebook. The current study revealed that over two-thirds

of participants were from rural areas, and more than half of them had 2–3 siblings, with more than two-thirds having 5–7 total number of family members; this explains that most students revealed that their houses were crowded. Moreover, nearly two-thirds stated that their income was barely enough for the family.

These findings corroborate with Hanafi and Mohamed (2013), who found that the risk of H. pylori infection seropositivity correlated with socioeconomic status, lifestyle, and environmental factors, especially crowded housing. Similarly, Eusebi, Zagari, and Bazzoli (2014) confirmed that low socioeconomic conditions in childhood were the most critical risk factors for H. pylori infection.

Fashner and Gitu (2015) reported bleeding and gastrointestinal perforation as complications in patients with H. pylori-positive infection. Thus, the need for preventing H. pylori infection is imperative, forcing the researchers to provide students with educational sessions to augment their knowledge and practices regarding the prevention of H. pylori infection; this aligns with Hafiz et al. (2021), who demonstrated that health awareness through educational programs could increase adherence to seeking medical advice and prompt treatment.

In current study, the difference in the overall mean scores of students' knowledge and practices was statistically significant,

and the levels of knowledge and practices were more satisfactory after the educational program implementation than before. Likewise, **Alidosti, Delaram, and Reisi (2012)** who reported that health education increases knowledge and improves homemakers' practices about preventing H. pylori infection. In addition, **Atef Ibrahiem and Mohamed Saad (2021)** reported that the utilization of health awareness packages significantly enhanced family members' knowledge and practices to prevent H. pylori infection. Moreover, a significant positive correlation was established between students' knowledge and preventive practices regarding H. pylori infection through program phases, suggesting that increasing students' knowledge enhances their practices toward preventing H. pylori infection, which aligns with **Atef Ibrahiem and Mohamed Saad (2021)**. Finally, H. pylori infection is very serious and has severe side effects on infected patients; thus, it is essential to consider the compliance of preventive measures, including healthy habits.

### Conclusions

Based on the current study, there was a statistically significant difference in the overall mean scores of students' knowledge and practices between pre- and post-implementation of the health literacy sessions ( $t = 15.365$ ,  $P = 0.000$ ); ( $t = 13.763$ ,  $P = 0.001$ ) respectively. Moreover, there was a statistically significant positive correlation between students' knowledge and practices through program phases. As well, students' knowledge and practices concerning preventive measures of H. pylori infection raised after implementation of health literacy sessions.

### Recommendations:

Based on the study findings the following issues recommended:

- Screening of school and university students for H. pylori infection should be mandatory for its early detection and treatment.
- The screening test of H. pylori for all populations and eradication therapy for all positive patients should be affordable.
- Furthermore, the ministry of health should launch mass media awareness campaigns for preventing H. pylori infection and conduct annual check-ups for early detection and diagnosis.
- Future studies about screening of adolescents for early detection of asymptomatic H. pylori infection.

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### Declaration of conflicting interests

The authors declare no conflicts of interest regarding the research or publication of the paper.

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