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# Knowledge and awareness level of *Helicobacter pylori* infection among medical students in Umm Al-Qura University: A cross-sectional electronic survey

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## ABSTRACT

*Background and aims:* Helicobacter pylori are a significant pathogen that can lead to various complications such as gastric cancer and peptic ulcer. Identifying the infection pattern will help in early diagnosis and treatment to avoid serious complications. Accordingly, our study is aimed to evaluate the understanding in level between students of medical College at Umm Al-Qura University (UQU). *Methods:* An online descriptive cross-sectional survey was distributed in March 2022. The questionnaire was administered to all medical students from second to sixth grade who study in UQU during the 2021-2022 academic year. *Results:* Overall, there were 334 participants from the second to the sixth year students involved in the survey. Most of the participants' age ranged from 21-and 24-years old, representing 68.8%, and most of the participating students were males, representing 67.06%. Students from fifth-year medical students had higher responses representing 33.23%, than in other academic years. In addition, the association between students with a previous positive history of *H-pylori* and a poor level of *H-pylori* knowledge was significantly positive (P-value, 0.003). *Conclusion:* The Early detection and intervention of *H-pylori* are significant in preventing serious complications. However, our findings indicate that students are not informed about basic knowledge of *H-pylori*, so we suggest further extensive educational campaigns.

**Keywords:** Complications; infectious disease; knowledge; Medical students; peptic ulcer.

## 1. INTRODUCTION

*Helicobacter pylori* are a gram-negative spiral shape bacterium (Dunn et al., 1997). It was discovered and isolated by Barry J. Marshall and Robin Warren in 1982 (Marshall et al., 1984). *H-pylori* live in the human stomach (Dunn et al., 1997). It is associated with many stomach diseases such as chronic gastritis, Atrophic gastritis, peptic ulcer, gastric lymphoma, and gastric carcinoma (Parikh et al., 2021; Al-Ghadeer et al., 2021). The transmission of the organism can be through fecal-oral route, oral-oral route, or it can be iatrogenic, which is the least common (Dunn et al., 1997). In addition, low socioeconomic status is considered a significant risk factor (Parikh et al., 2021). Other risk factors include poor hygiene, poor sanitation, and smoking (Kotilea et al., 2019). Around 40% to 50% worldwide carry *H-pylori* infection (Hafiz et al., 2021). However, in the Riyadh region in Saudi Arabia, the incidence is 34.7%. Patient who carries *H-pylori* can be asymptomatic, but they start experiencing symptoms when the bacterium leads to gastritis and peptic ulcer. Symptoms are abdominal pain, nausea, vomiting, and dyspepsia (Parikh et al., 2021).

The pathogenesis and the outcomes of *H-pylori* infection are usually described as a complex interaction between bacterial virulence factors, host, and environmental factors (Kao et al., 2016). This bacterium mainly survives and adapt in the acidic stomach (Kao et al., 2016). Then it will move toward epithelium cells by its flagella-mediated motility causing the attachment to host cells by adhesions and through specific receptors interaction, which will lead to tissue damage by toxin release (Kao et al., 2016). *H-pylori* testing is usually not recommended if patients with no symptoms and no past history of peptic ulcer disease, but we can classify tests into invasive which require endoscopy and biopsy (e.g., histological examination and rapid urease test) and non-invasive techniques such as serology, the urea breath test, detection of *H-pylori* antigen in stool specimen, and usually they consider that the urea breath test (UBT) is a gold standard non-invasive method for *H-pylori* diagnosis (Ricci et al., 2007).

The importance of starting *H-pylori* treatment as soon as possible is to manage gastrointestinal disorders such as peptic ulcers and to prevent further complications like gastric cancer, the recommended treatment for infection eradication is the standard triple therapy using a proton pump inhibitor or ranitidine bismuth citrate, combined with clarithromycin and amoxicillin or metronidazole they treated symptomatically using antibiotics that kill bacteria and proton pump inhibitor (PPI) which is class of medication for the treatment of heartburn and acid-related disorders this medication allows the tissues damaged by the infection to heal (Goderska et al., 2018). Unfortunately, not enough studies about *H-pylori* were done among medical students. However, they are at risk of getting the infection, so this topic needs further work and investigations on medical students.

The target of our study is to determine the level of knowledge and awareness about *H-pylori* among umm Al-Qura university medical students and raise concern regarding *H-pylori* infection in all aspects.

## 2. MATERIALS AND METHODS

This is a descriptive cross-sectional study based on an electronic questionnaire by google forms, conducted in March 2022 after the Biomedical ethics committee obtained the ethical approval at Umm Al-Qura University (UQU), College of Medicine, Makkah, KSA, with Approval No(HAPO-02-K-012-2022-05-1081). Our sample size was calculated by Epi info software VER 2.1 (Sullivan et al., 2009). The minimum sample size to accomplish a precision of 5% with a 95% confidence interval is 350. However, our final included sample size during data collection was 334. The survey was adapted based on a previously published study (Hafiz et al., 2021). It was publicized to the students via social media platforms.

The first author's email was written with the massage to answer any questions or solve any issues, and all students acquired an informed consent. We include both male and females students from the second to the sixth year at the medical college of UQU, and students in a preparatory year who refused to participate were excluded. The questionnaire included two sections. The first part estimated the demographic input such as age, gender, academic year, coffee and tea consumption, source of drinking water, and history of an infection of *H-pylori*. The second part assessed the knowledge and awareness concerning *H-pylori* infection through 14 true and false questions like type, signs, risk factors, mood of transmission, and complications of *H-pylori* disease. This study followed the Modified Bloom's criteria to estimate knowledge score, whereas 75% was used as a cut-off point. As a result, a good level of knowledge was determined if the final score was more than or equal to 75%, while less than 75% was considered a poor level of knowledge (Wildani et al., 2021). The obtained data was initially gathered in an Excel sheet to be checked. Afterward, we used SPSS software version 23 for the data analysis, the mean, standard deviation, and significance utilizing the Chi-square test, with a $<0.05$ p-value to be considered statistically significant.

## 3. RESULTS

This study included 334 medical students in the college of medicine at Umm Al-Qura University. Table 1 includes students' social demographic information. Students' age mean was 21.7 (SD=1.89); most respondents aged between 21-24 years old representing

(n=229, 68.6%). The majority of students were male (n=224), while the female was (n=110). Furthermore, 5th-year medical students responded higher, representing (n=111) than other academic years. Students' level of awareness when they asked about ever heard of *H-pylori* infection was poor (n=311, 93.1%). At the same time, most of the students had a poor level of knowledge concerning *H-pylori* infection representing (n=297, 88.92%) (Figure 1). Our findings show that (n=283, 84.7%) of participants have a history of previous *H-pylori* infection. Most of students consume coffee and/or tea representing (n=287, 85.9%). Moreover, most of students' families utilized bottled water as source for water drinking (n=143, 42.8%) (Table 1).

**Table 1** Demographic data

| Variable | Category | N. | (%) |
|---|---|---|---|
| Age groups | 18-20 | 95 | 28.4% |
| | 21-24 | 229 | 68.6% |
| | 25-32 | 10 | 3.0% |
| Gender | Male | 224 | 67.1% |
| | Female | 110 | 32.9% |
| Academic year | 2nd year | 92 | 27.5% |
| | 3rd year | 47 | 14.1% |
| | 4th year | 52 | 15.6% |
| | 5th year | 111 | 33.2% |
| | 6th year | 32 | 9.6% |
| Level of awareness of *H-pylori* | Yes | 23 | 6.9% |
| | No | 311 | 93.1% |
| Previous history of *H-pylori* | Yes | 283 | 84.7% |
| | No | 51 | 15.3% |
| Coffee and/or Tea intake | Yes | 287 | 85.9% |
| | No | 47 | 14.1% |
| Sources of drinking water | Tap water | 55 | 16.5% |
| | Bottled water | 143 | 42.8% |
| | Both | 136 | 40.7% |
| Age mean (SD) | 21.7 (SD=1.89) | | |

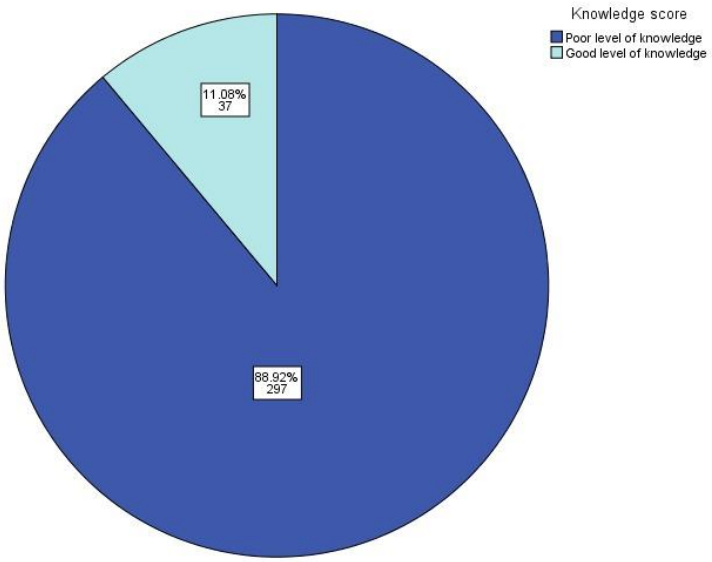


**Figure 1** Students' level of knowledge concerning *H-pylori* infection (N=334).

There is a statistically significant variation between 5th-year medical students and poor level of *H-pylori* knowledge (P-value, 0.013) (Table 2). Furthermore, there is a significant correlation between students with a previous positive history of *H-pylori* and a poor level of *H-pylori* knowledge (P-value, 0.003). On the other hand, no statistically significant variation between the level of knowledge and students' age groups, gender, level of *H-pylori* awareness, coffee and/or tea intake, and source of water drinking (P-value, 0.828, 0.853, 0.730, 0.450, 0.616, respectively) (Table 2).

**Table 2** Association between level of knowledge and students' social-demographic data

| Variable | Level of knowledge | | P-value |
|---|---|---|---|
| | Good n (%) | Poor n (%) | |
| Age | | | |
| 19-22 | 9 | 86 | 0.828 |
| 23-25 | 27 | 202 | |
| 26-30 | 1 | 9 | |
| Gender | | | |
| Male | 24 | 200 | 0.853 |
| Female | 13 | 97 | |
| Academic year | | | |
| 2nd year | 6 | 86 | 0.013* |
| 3rd year | 1 | 46 | |
| 4th year | 5 | 47 | |
| 5th year | 18 | 93 | |
| 6th year | 7 | 25 | |
| Level of awareness | | | |
| Yes | 3 | 20 | 0.730 |
| No | 34 | 277 | |
| Previous history of *H-pylori* | | | |
| Yes | 37 | 246 | 0.003* |
| No | 0 | 51 | |
| Coffee and/or Tea intake | | | |
| Yes | 30 | 257 | 0.450 |

| | | | |
|---|---|---|---|
| No | 7 | 40 | |
| Sources of drinking water | | | |
| Tap water | 4 | 51 | 0.616 |
| Bottled water | 17 | 126 | |
| Both | 16 | 120 | |

## 4. DISCUSSION

This cross-sectional study aimed to determine the knowledge and awareness of helicobacter pylori infection among medical students at UQU. Our findings show that 88.92% of the survey respondents have a poor level of knowledge about *H-pylori* infection. In comparison, another study done at King Saud University shows that 57.6% of Applied Medical Sciences students and 56.1 % of Nursing College students has poor knowledge of H-pylori infection (Hafiz et al., 2021). Dissimilarly, another study was done with the aim of assessing the level of awareness of the Chinese physicians and population regarding *H-pylori* infection, showing that the surveyed physicians have a better understanding of H-pylori infection than the general population (Wu et al., 2020).

According to a systematic review study published in 2017 and included 62 countries, the prevalence of *H-pylori* infection was 48.5% in all participants (Hooi et al., 2017). Another study presented evidence that *H-pylori* infection is highly prevalent in the MENA region (Alsulaimany et al., 2020). While in Riyadh city in Saudi Arabia, the incidence is 34.7% (Alghamdi et al., 2020). However, our results show that out of 334 respondents, only 23 are aware of H-pylori infection, and only 3 out of them have good knowledge about the infection, according to our survey. In contrast, the KSU study shows that 257 out of 334 health and non-health science students are aware of *H-pylori* infection and only 28 of them have good knowledge about the infection (Hafiz et al., 2021).

This study shows that 283 of the participants had a history of H-pylori infection. However, 246 of them have an inadequate understanding of the infection. Compared to the KSU study, 60 of the total participants had a previous history of *H-pylori*, and 20 of them had poor knowledge of the infection (Hafiz et al., 2021). Considering the difference between the number of male and female participants, 200 of the total male respondents have poor knowledge of *H-pylori* infection, whereas 97 of the female respondents have a low level of knowledge of the infection.

Surprisingly, our findings indicate that most surveyed students reported having a previous history of *H-pylori* infection. However, the KSU study dissimilarly said that most participants denied any prior history of *H-pylori* infection (Hafiz et al., 2021). Henceforth, we recommend further studies investigating the prevalence of the infection and annual screening for *H-pylori* infection for early detection to minimize its consequences.

**Strengths and limitations**

Although we used a precise, concise, and inclusive questionnaire in our assessment, the number of the female participants was inadequate, unlike the male participants, leading to a reduction in the accuracy of the results. Additionally, applying this study to a large population would provide more significant results that can be considered.

## 5. CONCLUSION

Our study demonstrates a poor level of awareness of Helicobacter pylori among Medical students at Umm Al-Qura University. Furthermore, even the students with a history of H-pylori infection have insufficient knowledge. Consequently, we recommend providing an extensive educational health campaign for Umm Al-Qura Medical students.

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**Ethical approval**

The study ethical approval was obtained by the Medical Ethics Committee of Umm Al-Qura University (ethical approval number: HAOP-02-K-012-2022-05-1081.

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**Conflicts of interest**

The authors declare that there are no conflicts of interests.

**Data and materials availability**

All data associated with this study are present in the paper.

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