Original Article :

Knowledge and Information Sources about Helicobacter Pylori in Saudi Arabia

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Abstract

Background and Aims:
The prevalence of Helicobacter pylori (HP) infection is high worldwide and varies significantly among different regions and countries. The sources of information about HP vary among different populations. Physicians, health professionals, TV, radios, books, internet and social media are sources to get health-related information. Given the importance of accurate and reliable information, it is crucial to evaluate the knowledge and information sources related to HP among the general population in Saudi Arabia. The study was aimed to assess the public knowledge and information sources regarding Helicobacter pylori in Saudi Arabia.

Methods:
A cross-sectional study using a self-administered online questionnaire was carried out to examine the public knowledge and their information sources about Helicobacter Pylori from April to December in 2023. Convenience sampling procedure was applied. Knowledge scores were compared with the socio-demographic characteristics using the Mann-Whitney Z-test and Kruskal Wallis H-test. Normality test has been performed using the Shapiro-Wilk test and Kolmogorov Smirnov test.

Result:
The overall mean knowledge score was 19.9 (SD 8.60) out of 40 points. Accordingly, it was found that more than half (52.9%), 38.8 % and 8.3% had moderate, poor and good knowledge respectively. Factors associated with increased knowledge include higher educational levels, working in the medical field, previous diagnosis of HP infection, family history of HP infection, and medical sources of HP infection.

Conclusion:
This study found that individuals with higher education levels, working in medical field, with a previous HP diagnosis, with a family history of infection, and those who obtained information from medical sources demonstrated better knowledge about HP infection. Addressing these gaps in knowledge is crucial, and thus, it is recommended to implement awareness campaigns aimed at bridging these knowledge gaps among the Saudi general population.

Keywords:
Helicobacter pylori; Knowledge; Information; Sources; Saudi Arabia

Introduction:

Helicobacter pylori (HP) is a spiral-shaped gram-negative bacterium that affects a substantial portion of the global population, with an estimated prevalence of up to 50%. This bacterium is recognized as the primary etiological agent for peptic ulcer disease, gastric cancer, and chronic gastritis[1,2].

The prevalence of HP infection is high worldwide, and it varies significantly among different regions and countries. The highest prevalence was reported in Africa (70.1%), followed by Latin America (63.4%), Asia (54.7%), and Europe (34.3%)[3]. In Saudi Arabia, studies have indicated a high prevalence of HP infection among school-aged children (40%)[4], and in the Jazan Province to be 46.5%[5].

The factors contributing to the high prevalence of HP infection include poor sanitation, low socioeconomic status, overcrowding, and lack of education[6,7]. However, in recent years, there have been improvements in living conditions, education, and hygiene practices, resulting in a reduction in HP infection seroprevalence among Saudi children[4].

Several studies have investigated the knowledge, attitudes, and practices of the general population and healthcare professionals towards HP infection. A cross-sectional study conducted in the United Arab Emirates found that only 24.6% of the respondents had heard of HP infection. Moreover, 61% of the participants did not know the link between HP infection and gastric cancer[8]. Another study conducted in China reported that 47% of the respondents had a low knowledge level of the risk factors and warning symptoms of gastric cancer[9] . A population-based study in Korea reported that 57.5% of the respondents were aware of HP infection as a risk factor for gastric cancer[10]. In contrast, a survey in China showed that physicians had a better understanding of HP's harmfulness (83.9%) than the general population, and only 35% of the population had adequate knowledge regarding HP's harmfulness[11].

The sources of information about HP infection vary among different populations. Physicians, healthcare professionals, TV, radios, books, the internet and social media networks are sources to get health-related information. A study that was conducted in Jordan revealed that the most common source of information about HP infection was non-medical sources (e.g., family, friends, social media, and TV) (70.5%). In contrast, only 29.5% were from medical source[12]. In addition, a study conducted in Saudi Arabia revealed that information

provided through social media platforms has a huge influence on participants[13].

In the current digital age, the internet has become a prominent source of information for individuals seeking knowledge on various subjects, including healthcare[14]. With the recent COVID-19 outbreak, reliance on online sources for information has further increased, leading to the development of online tools and platforms by governments and individuals[15]. In Saudi Arabia, social media platforms have emerged as influential sources of healthcare information, with individuals considering them trustworthy[13].

Given the importance of accurate and reliable information, it is crucial to evaluate the knowledge and information sources related to HP infection among the general population in Saudi Arabia. In order to improve understanding and enhance educational interventions for the prevention and management of HP infection in Saudi Arabia, this study aimed to assess the public knowledge and information sources regarding Helicobacter Pylori in Saudi Arabia.

Methods and materials:

Study Design:

In Saudi Arabia, a cross-sectional study employing an online self-administered questionnaire was carried out to examine the public knowledge and their information sources about Helicobacter Pylori from April to December in 2023.

Sampling procedure:

Convenience sampling procedure was applied in this study to invite the study population to participate in the study. To reach a wider range of participants from different sociodemographic groups, the questionnaire link was disseminated via social media platforms. To further ensure a wider reach and representation of the target population, data collectors from each region in Saudi Arabia have been engaged. Such approach helped to capture diverse perspectives and reduce the potential for regional biases. The cover letter for the questionnaire made clear the study's objectives and inclusion criteria. The participants were asked to confirm their participation before the questionnaire even starts. If participants agree to provide their consent, they were instructed to start answering the questions; otherwise, the survey was closed.

Inclusion and exclusion criteria:

All Saudis aged 18 and above who are willing to participate were included in the study. Individuals under the age of 18 or who live outside of Saudi Arabia were ex-

cluded.

Questionnaire tool:

A previously developed questionnaire was adapted and used in this study12. The study instrument is divided into two main sections with questions that are multiple choice and yes/no format. The first section, which consists of nine items, looked into the sociodemographic characteristics of the study participants (age, gender, marital status, educational level, work field), and whether they have ever had Helicobacter pylori infection, whether any of their family ever had Helicobacter pylori infection, and their source of information about Helicobacter Pylori. The second section examined participants' knowledge about Helicobacter Pylori infection, the knowledge about Helicobacter Pylori has been assessed by using a 40-item questionnaire, with the correct answer for each item has been identified and coded with 1, while the incorrect answer has been coded with 0. The total knowledge score has been calculated by adding all 40 items. Score ranging from 0 to 40 points has been generated. The higher the score, the higher the knowledge about HP infection. By using 50% and 75% as cutoff points to determine the level of knowledge, respondents were classified as having poor knowledge if the score was less than 50%, 50% to 75% were moderate, and above 75% were classified as having good knowledge levels. Expert healthcare professionals reviewed the questionnaire instrument for comprehensibility and understandability. The questionnaire was translated into Arabic using forward-backward translation technique and was tested on a random sample of our study population to identify any concerns with context and content.

Piloting of the questionnaire tool:

The questionnaire tool was evaluated and approved by expert clinicians for its external validity. They were questioned regarding the questions' simplicity and understandability, as well as their validity and whether any of them are challenging to comprehend. Before the questionnaire was used on a wider scale, a pilot research with a small group of participants was carried out to evaluate its comprehension.

Institutional Review Board Statement:

The Imam Mohammad ibn Saud Islamic University (IMSIU) research ethics committee approved the study (project number 528-2023; approval date, September 11, 2023). All writings were done in accordance with the ethical principles of the Declaration of Helsinki. A brief description of the study was included with the survey link, with a full explanation on the

survey's front page. Participants were informed that consent was provided by completing the survey. Throughout the study, the consent of all participants and the data were obtained in complete confidence.

Sample size:

The required sample size from each study population was 385 participants, based on a confidence interval of 95%, a standard deviation of 0.5, and a margin of error of 5%.

Statistical analysis:

Categorical variables were shown as numbers and percentages. Continuous variables were calculated and given as mean and standard deviation. The knowledge score has been compared with the socio-demographic characteristics using the Mann-Whitney Z-test and Kruskal Wallis H-test. Normality test has been performed using the Shapiro-Wilk test and Kolmogorov-Smirnov test. The knowledge score follows the non-normal distribution. Thus, the non-parametric tests were applied. Statistical significance was set to $p<0.05$. All data analyses were carried out using the statistical package for social sciences, version 26 (SPSS, Armonk, NY: IBM Corp, USA).

Result:

This study recruited 480 participants. As described in Table 1, 54.6% of the respondents were aged between 18 and 25 years, with females being dominant (74.2%). Nearly two-thirds (65.4%) were not married, and 70.4% had diploma or higher degree holders. Approximately 28.1% were working in the medical field. The prevalence of participants who were previously diagnosed with HP infection was 13.1%, while those with a family history of HP infection constitute 30.8%. The major sources of HP infection information were non-medical sources (i.e., family, friends, social platforms, etc.). In addition, 89.8% were living in the city.

Table 1: Socio-demographic characteristics of participants (n=480):

Study variables	N (%)
Age group	
• 18 – 25 years	262 (54.6%)
• 26 – 30 years	93 (19.4%)
• 31 – 35 years	22 (04.6%)
• 36 – 40 years	15 (03.1%)
• 41 – 45 years	33 (06.9%)
• 46 – 50 years	33 (06.9%)
• >50 years	22 (04.6%)
Gender	
• Male	124 (25.8%)
• Female	356 (74.2%)
Marital status	
• Unmarried	314 (65.4%)
• Married	166 (34.6%)
Educational level	
• Secondary or below	142 (29.6%)
• Diploma or higher	338 (70.4%)
Work field	
• Medical	135 (28.1%)
• Non-medical	160 (33.3%)
• Not working	185 (38.5%)

Previous diagnosis of HP infection	
• Yes	63 (13.1%)
• No	417 (86.9%)
Family history of HP infection	
• Yes	148 (30.8%)
• No	332 (69.2%)
Sources of HP infection information	
• Medical sources (through health practitioners or during my study)	188 (39.2%)
• Non-medical sources (through family/friends/ TV/radio/social media platforms)	292 (60.8%)
Current place of residence	
• Village	49 (10.2%)
• City	431 (89.8%)

In the assessment of knowledge of HP infection (Table 2), it was observed that only 53.3% were correct about the nature of HP infection. However, most of them were correct (86.9%) about the most common organ being affected by HP. Similarly, respondents were aware that HP's most common transmission route was contaminated food (81.5%) and water (76.9%). Respondents were also correct that the top three most common HP symptoms were abdominal pain (85%), nausea or vomiting (80.2%), and abdominal bloating (68.3%). However, their knowledge of how to diagnose HP was suboptimal, as they were only identified by stool analysis test (71.9%). Other methods to diagnose HP had low ratings. Regarding HP treatment, many respondents knew that medical treatment was the first line of choice (82.3%). Regarding the general knowledge of HP infection, the top three statements where our respondents showed adequate knowledge were "HP can cause stomach ulcers" (67.9%), "HP may threaten human life if it becomes severe and not treated" (56.3%) and "Spicy foods may worsen the symptoms of HP infection" (55.4%). The total mean knowledge was 19.9 (SD 8.60).

Table 2: Assessment of the knowledge of HP infection (n=480)

Statement	Correct answer N (%)
1. Nature of HP infection [bacteria]	256 (53.3%)
Organs affected by HP	
2. Stomach [yes]	417 (86.9%)
3. Brain [no]	315 (65.6%)
4. Heart [no]	307 (64.0%)
5. Lung [no]	250 (52.1%)
6. Liver [no]	191 (39.8%)
Transmission route of HP	
7. Contaminated food [yes]	391 (81.5%)
8. Contaminated water [yes]	369 (76.9%)
9. Sexual contact [no]	252 (52.5%)
10. Air [no]	243 (50.6%)
11. Blood [yes]	193 (40.2%)
12. Contaminated surfaces [no]	159 (33.1%)
HP symptoms	
13. Abdominal pain [yes]	408 (85.0%)
14. Nausea or vomiting [yes]	385 (80.2%)
15. Abdominal bloating [yes]	328 (68.3%)
16. Rash in the skin [no]	198 (41.3%)
17. Back pain [no]	189 (39.4%)
18. Cough [no]	183 (38.1%)
19. Headache [no]	167 (34.8%)
20. Shortness of breath [no]	159 (33.1%)
21. Chest pain [no]	155 (32.3%)
22. Fever [no]	109 (22.7%)
23. Fatigue [no]	55 (11.5%)

HP diagnosis	
24. Stool analysis test [yes]	345 (71.9%)
25. Endoscopy and biopsy [yes]	225 (46.9%)
26. Urea breath test [yes]	180 (37.5%)
27. Clinical examination [no]	130 (27.1%)
28. Urine analysis test [no]	123 (25.6%)
29. Blood test [no]	105 (21.9%)
HP treatment	
30. Medical treatment [yes]	395 (82.3%)
31. Self-limited disease [no]	268 (55.8%)
32. Non-medical treatment [no]	180 (37.5%)
General knowledge	
33. HP can cause stomach ulcers [yes]	326 (67.9%)
34. HP may threaten human life if it becomes severe and not treated [yes]	270 (56.3%)
35. Spicy foods may worsen the symptoms of HP infection [yes]	266 (55.4%)
36. Helicobacter pylori can cause duodenal ulcers [yes]	254 (52.9%)
37. Helicobacter pylori can cause stomach cancer [yes]	245 (51.0%)
38. Chronic stress may increase symptoms that are caused by HP infection [yes]	243 (50.6%)
39. Helicobacter pylori can cause mucosa-associated lymphoid tissue [yes]	166 (34.6%)
40. At least 50% of Saudi's population has Helicobacter pylori infection [yes]	148 (30.8%)
Total knowledge score (mean ± SD)	**19.9 ± 8.60**

In Figure 1, 52.9% of the respondents were considered to have moderate knowledge, 38.8% were poor, and only 8.3% had good knowledge.

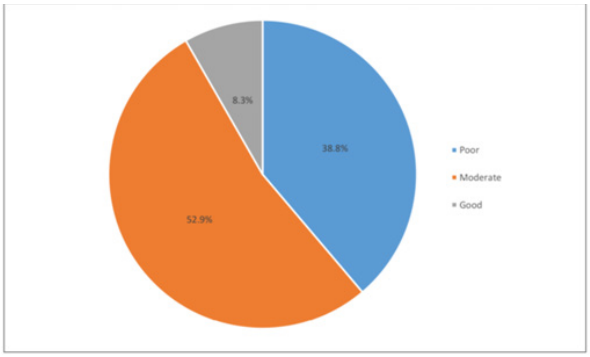


Fig. 1 showing level of Knowledge about HP Infection

When measuring the differences in the score of knowledge according to the socio-demographic characteristics of participants (Table 3), it was revealed that a higher knowledge score was more associated with having a diploma or higher degrees (Z=3.675; p<0.001), those working in the medical field (H=7.262; p=0.026), those who were diagnosed previously with HP infection (Z=2.202; p=0.028), those with family history of HP infection (Z=3.416; p=0.001) and those who had sources of HP infection through medical sources (Z=3.681; p<0.001).

Table 3: Differences in the score of knowledge in relation to the socio-demographic characteristics of participants (n=480):

Factor	Knowledge Score (40) Mean ± SD	Z-test	P-value §
Age group			
• ≤25 years	19.3 ± 9.00	1.398	0.162
• >25 years	20.6 ± 8.06		
Gender			
• Male	19.8 ± 8.43	0.224	0.823
• Female	19.9 ± 8.67		
Marital status			

• Unmarried	19.9 ± **8.75**	0.321	0.748
• Married	19.9 ± **8.34**		
Educational level			
• Secondary or below	17.8 ± **8.74**	3.675	**< 0.001** **
• Diploma or higher	20.8 ± **8.39**		
Work field			
• Medical	**8.03** ± 21.3	7.262	**0.026** ‡ **
• Non-medical	**7.81** ± 20.5		
• Not working	**9.43** ± 18.4		
Previous diagnosis of HP infection			
• Yes	5.73 ± 22.9	2.202	** 0.028
• No	8.87 ± 19.4		
Family history of HP infection			
• Yes	22.5 ± **6.48**	3.416	**0.001** **
• No	18.8 ± **9.17**		
Sources of HP infection information			
• Medical sources	21.8 ± **8.42**	3.681	**< 0.001** **
• Non-medical sources	18.7 ± **8.51**		
Current place of residence			
• Village	18.1 ± **8.97**	1.504	0.133
• City	20.1 ± **8.54**		

§ P-value has been calculated using Mann Whitney Z-test.

‡ P-value has been calculated using Kruskal Wallis H-test.

** Significant at $p<0.05$ level.

Discussion:

This study is carried out to determine the knowledge level of Saudi Arabia's general population regarding Helicobacter Pylori (HP) infection. This study finds a modest level of knowledge among the general public. Among our population (n=480), 52.9% were considered to have moderate knowledge. However, nearly 40% had a poor understanding of HP infection, and only 8.3% were categorized as having good knowledge levels. The total mean knowledge score was 19.9 (SD 8.60) out of 40 points. This is almost consistent with a previous study where nearly two-thirds (65.4%) of the respondents were aware of HP, with 24.3% correctly identifying all answers to the knowledge questions[16]. Consistent with these findings, another study found good knowledge among university students, although they observed that the elderly and those residing in rural areas were considered to have poor knowledge of HP[17]. On the contrary, several studies documented poor understanding of the HP disease, whether they are the general population[8,12,18-20] or the healthcare practitioners[11].

The knowledge about HP infection may vary according to region. Our study showed better knowledge levels of the study population than the other studies published in our region[18,19]. Data from our study suggest that being more educated and working in the medical field may possess a better understanding of the HP bacterium than the other participants. This is mirrored by an-

other study where they found a significant association between knowing HP infection and the level of education (p=0.03), with the higher educational levels demonstrating more knowledge about HP infection[21].

Moreover, in the specific assessment of the knowledge about the basic facts of HP infection, we noted that more than half (53.3%) knew that the nature of HP is a bacterium and were aware that the stomach was the most important organ being the most affected. However, only 39.8% knew that HP had no direct influence on the liver. Likewise, the majority of our population was correct that HP could be transmitted through contaminated food (81.5%) and water (76.9%), but only 40.2% believed that blood was also a transmission route. Furthermore, some of our respondents were unaware of other symptoms of HP, including fatigue (11.5%), fever (22.7%), and shortness of breath (33.1%). In addition, understanding the HP diagnosis method was poor in some cases, such as endoscopy and biopsy (46.9%) and urea breath test (37.5%). While In Singapore, respondents believed that the fecal-oral was the major route of transmission (26%), and 35.3% knew of screening modalities, with half of them (50.8%) being willing to be examined on blood or breath tests (52.6%)[22].

Although around half of our respondents believed that HP causes stomach ulcers/cancer and duodenal ulcers, only 34.6% believed that it could also cause mucosa-associated lymphoid tissue. In comparison to the study done in the UAE, more than sixty percent of the sample population was not aware of the connection between HP and gastric cancer, while nearly half (45%) cited that bacterial infections could result in developing stomach ulcers[8].

Studies indicate that knowledge is positively associated with a previous history of HP infection[12,20,23]. This was also observed in our study, as both personal and family history of HP infection were identified as predictors of increased knowledge. These results are comparable to a previous study wherein having heard of HP infection and previous diagnosis of the bacterium disease were found to have a direct association with the level of knowledge[19]. Opposing these reports, another study suggested that the previous history of HP is directly associated with poor knowledge[18].

The majority of our respondents obtained HP information from non-medical sources (i.e., family and friends, TV, radio, or social media platforms). However, when comparing the knowledge between medical and non-medical sources of HP information, medical sources (i.e., medical

healthcare professionals or college curriculum) were found to have better knowledge than those who obtained HP information from non-medical sources ($p<0.001$). This mirrored the study conducted in Jordan as it suggested high levels of knowledge being seen in participants who obtained information from medical sources and those working in the medical field[12].

Limitations:

The study relied on a self-administered online survey, which may have excluded individuals who do not have access to the internet or are less likely to participate in online surveys. This could introduce selection bias and limit the generalizability of the findings to the entire Saudi population. In addition, the data collected through self-reported surveys are subject to recall bias and social desirability bias. Respondents may not accurately recall or report their knowledge levels or may provide answers they believe are socially acceptable, leading to potential inaccuracies in the data.

Conclusion:

In conclusion, while the level of knowledge among the Saudi population regarding Helicobacter pylori (HP) infection appears to be adequate, there is still room for improvement. This study found that individuals with higher levels of education, those working in the medical field, those with a previous HP diagnosis, those with a family history of the infection, and those who obtained information from medical sources demonstrated better knowledge about HP infection. Addressing the existing gaps in knowledge is crucial, and therefore, it is recommended to implement awareness campaigns aimed at bridging these knowledge gaps among the Saudi general population. In particular, utilizing social media and mass media platforms can play significant roles in disseminating information about HP infection. These channels have the potential to reach a wide audience and provide accessible and easily understandable information that can help enhance public understanding of the infection. By increasing awareness and understanding of HP infection, individuals can make informed decisions regarding prevention, early detection, and treatment. Ultimately, improving knowledge about HP infection can contribute to better public health outcomes and reduce the burden of this common bacterial infection in Saudi Arabia.

Authors' Contributions:

All authors have contributed equally to all processes of the research work. They have read and agreed to the published version of the manuscript.

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Ethical Approval:

The Imam Mohammad ibn Saud Islamic University (IMSIU) research ethics committee approved the study (project number 528-2023; approval date, September 11, 2023).

Conflicts of interest:

The authors report no conflicts of interest in this work.

Informed Consent:

Informed consent was attained from all participants within the study.

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