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The Prevalence of Helicobacter Pylori Infection and Its Relationship to Age and Gender in the City of Al-Asabaa, Libya

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إنتشار بكتيريا الملوية البوابية (*Helicobacter Pylori*) وعلاقتها بالعمر والجنس في مدينة الأصابعة، ليبيا

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Abstract:
The study aimed to determine the prevalence of Helicobacter pylori bacteria in the Libyan city of Al-Asabaa and the association between infection status and demographic factors like age and gender. The study used a retrospective methodology, collecting data from a random sample of 160 individuals of both sexes who had symptoms suggesting infection and who had visited private medical laboratories in the city during 2024. The participants' ages ranged from 2 to 81 years. Venous blood samples were collected from these individuals, and the serum was separated by centrifugation. The levels of IgG and IgM antibodies were measured using the chemiluminescence immunoassay (CLIA) method with a Maglumi800 device to detect the presence of the bacteria. The results showed that 75% of the participants (120 out of 160) had positive results for the presence of the bacteria. Among the positive cases, the breakdown was as follows: 34 were positive for both IgG and IgM, 24 for IgM only, and 62 for IgG only. The study did not find a statistically significant relationship between the prevalence of the infection and gender. The percentage of infected males (36.25%) was close to the percentage of infected females (38.75%). The Chi-Square value of 0.1336 and a P-value of 0.715 confirmed the lack of association between gender and infection status. In contrast, the results showed a statistically significant relationship between age and H. pylori infection. The P-value was 0.0089, with the highest prevalence rates found in the younger age groups: 22 to 41 years (27.5%) and 2 to 21 years (26.25%). A sharp decline in the infection rate was observed in the oldest age group, from 62 to 81 years (1.25%). The study recommends the necessity of conducting further epidemiological research in different regions of Libya, with a focus on identifying the environmental, behavioral, and genetic factors that may explain the notable variation in prevalence rates among different cities. These findings aim to inform the development of effective prevention strategies to prevent the infection and curb its spread.

Keywords: Prevalence, Helicobacter Pylori, Infection, Al-Asabaa, Libya.

الملخص
هدفت هذه الدراسة إلى تحديد معدل انتشار بكتيريا الملوية البوابية *(Helicobacter pylori)* في مدينة الأصابعة الليبية، والتحقق من العلاقة بين انتشار العدوى والعوامل الديموغرافية مثل العمر والجنس. اعتمدت الدراسة على منهجية استعادية، حيث جُمعت البيانات من عينة عشوائية مكونة من 160 فردًا من الجنسين، ممن لديهم أعراض توحي بالعدوى والذين راجعوا بعض المختبرات الطبية الخاصة في المدينة خل العام2024، وتراوحت أعمار المشاركين بين 2 و 81 عامًا. تم جمع عينات دم وريدية من هؤلاء الأفراد، وفصل مصل الدم *(Serum)* عن طريق الطرد المركزي. وللكشف عن وجود البكتيريا، تم قياس مستويات الأجسام المضادة من نوعي *IgG IgM* باستخدام طريقة الكيمياء الضوئي*(CLIA)* ، بواسطة جهاز*Maglumi800*،

بينت النتائج أن 75% من المشاركين (120 من أصل 160) كانت لديهم نتائج إيجابية لوجود البكتيريا. من بين الحالات الإيجابية، 34 حالة كانت إيجابية لكل من *IgG* و*IgM*، و24 حالة كانت إيجابية لـ *IgM*فقط، و 62 حالة كانت إيجابية لـ*IgG* فقط. كما لم تُظهر الدراسة وجود علاقة ذات دلالة إحصائية بين انتشار العدوى والجنس، حيث كانت نسبة الذكور المصابين (36.25%) قريبة من نسبة الإناث المصابات (38.75%). وقد أكدت قيمة مربع كاي *(Chi-Square)* البالغة 0.1336 مع قيمة *P* البالغة 0.715 عدم وجود ارتباط بين الجنس وحالة العدوى. وعلى النقيض من ذلك، أظهرت النتائج وجود علاقة ذات دلالة إحصائية بين العمر والإصابة ب*H. pylori*. حيث كانت قيمة *P* هي 0.0089، وكانت معدلات الانتشار الأعلى في الفئات العمرية الأصغر سنًا: من 22 إلى 41 عامًا (27.5%) ومن 2 إلى 21 عامًا (26.25%). ولوحظ انخفاض حاد في معدل الإصابة فيا لفئة العمرية الأكبر سنًا، من 62 إلى 81 عامًا (1.25%). توصي الدراسة بضرورة إجراء المزيد من الأبحاث الوبائية في مناطق مختلفة من ليبيا، مع التركيز على تحديد العوامل البيئية والسلوكية والوراثية التي قد تفسر التباين الملحوظ في معدلات الانتشار بين المدن المختلفة، وذلك بهدف وضع استراتيجيات فعالة للوقاية من العدوى والحد من انتشارها.

الكلمات المفتاحية: إنتشار، الملوية البوابية، عدوى، الأصابعة، ليبيا.

Introduction

Helicobacter pylori (H. pylori) is a spiral, flagellated bacterium that is Gram-negative and can sometimes appear as a slightly curved rod [1]. This infection is found more often in developing nations than in industrialized ones. Research in various countries has shown that the rate of H. pylori (HP) infection varies significantly, with reports indicating less than 20% in European countries and exceeding 80% in some Eastern Mediterranean areas [2,3].

While many people infected with this bacterium show no symptoms, a small number do experience digestive issues [4]. HP is the primary cause of peptic ulcers, responsible for 90% of duodenal ulcers and around 50% to 80% of gastric ulcers [5]. It is classified as a class I carcinogen, meaning it can lead to stomach cancer and primary gastric B-cell lymphoma [6,7]. Humans are the main carriers of HP, which spreads through gastro-oral and oral-oral transmission.

Additionally, it can survive in milk and the stomachs of certain animals like sheep and cats [8]. The link between gender and HP infection rates remains debated [9]. The likelihood of infection generally increases with age, particularly in communities with lower socioeconomic status [10]. Detection of HP is typically conducted through serological tests that identify IgG antibodies, although tests for IgA and IgM antibodies are also available [11]. Thus, this study aims to investigate the prevalence of HP infection and how it relates to age and gender in the population of Al-Asabaa, Libya.

Material and methods:

Study design and population:

This retrospective study aimed to determine the prevalence of HP infection in the city of Al-Asabaa. The study included a random sample of 160 individuals presenting with symptoms suggestive of infection. These participants visited some private medical laboratories during the period from January 2024 to December 2024. The participants, who were of both genders, ranged in age from 2 to 81 years. The study relied on the analysis of data recorded in these laboratories, which included age, gender, and test results.

Collection and examination of samples:

Approximately five mL of venous blood was collected from each participant using a sterile needle and syringe technique. The blood samples were placed in sterile dry tubes. The serum was then separated from the whole blood by centrifugation at 3000 rotations per minute (rpm) for 5 minutes. The collected sera were tested to detect both types of immunoglobulin G(IgG) and immunoglobulin M (IgM), against H. Pylori. The levels of IgG and IgM antibodies were quantified using the chemiluminescence method (CLIA) with a Maglumi800 autoanalyzer, following the guidelines provided by the kit manufacturer. The results for IgG and IgM antibodies against H. Pylori were interpreted based on the manufacturer's criteria: IgG results were classified as Negative if they were less than 1.0unit per milliliter(U/mL) and Positive if they were 1.0U/mL or more, while IgM results were Negative if below 30U/mL and Positive if 30U/mL or above.

Results:

The results of this study showed that 120 of 160 cases (75%) were positive for Helicobacter pylori, and 40 cases (25%) were negative. It was also found that among the 120 positive cases, 34 had positive results for both of IgG and IgM, 24 were positive for IgM only, and 62 were positive for IgG only as shown in Figure 1 and Figure 2.

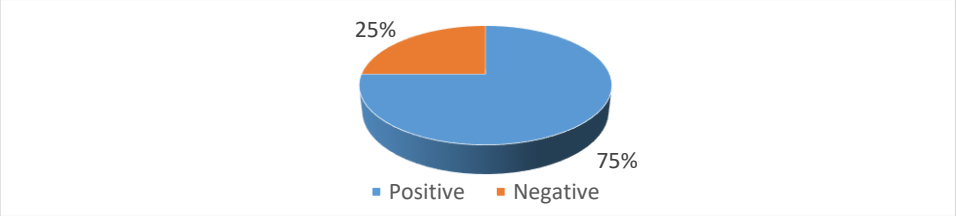

Figure 1: The positive and negative results for HP in study sample.

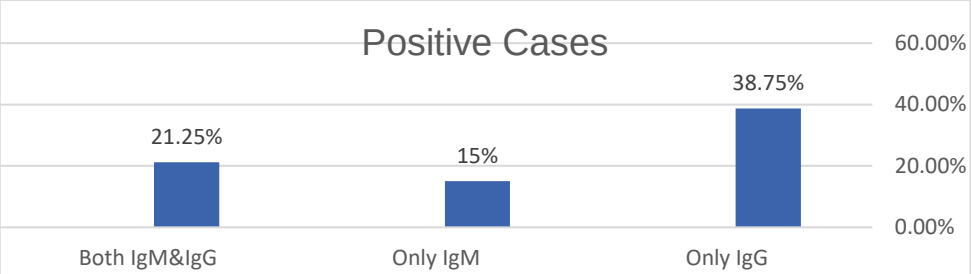

Figure 2: The distribution of positive cases of HP according to IgG, IgM, or both.

The relationship between the Prevalence of HP and gender:

Table 1 shows the prevalence of HP in relation to gender, the results show that out of the total 160 cases (120 positive and 40 negative), the prevalence of HP infection is 75% (120/160). Among the positive cases (infected with H. pylori), 36.25% were males and 38.75% were females. Among the negative cases (not infected with H. pylori), 11.25% were males, and 13.75% were females. The Chi-Square (X2) value of 0.1336 with a p-value 0.715 suggests that there is no statistically significant association between gender and HP infection status.

Table 1: Relationship between gender and HP infection.

Gender	Positive cases (n=120)		Negative cases (n=40)		Total (n=160)		df	Chi- Square	P-value
	Count	%	Count	%	Count	%			
Male	58	36.25	18	11.25	76	47.5	1	0.1336	0.715
Female	62	38.75	22	13.75	84	52.5			
Total	120	75	40	25	160	100			

The relationship between the Prevalence of HP and age:

Table 2 shows prevalence of HP in relation to age, the results show that the highest prevalence of HP infection is observed in the age groups of 22-41 years (27.5%) and 2-21 years (26.25%). The lowest prevalence is seen in the age groups of 62-81 years (1.25%). The X2 value of 11.5809 with a p-value of 0.0089 suggests that there is statistically significant association between age and HP infection status.

Table 2: Relationship between age and HP infection.

Age (years)	Positive cases (n=120)		Negative cases (n=40)		Total (n=160)		df	Chi- Square	P-value
	Count	%	Count	%	Count	%			
2-21	42	26.25	14	8.75	56	35	3	11.5809	0.0089
22-41	44	27.5	12	7.5	56	35			
42-61	32	20	8	5	40	25			
62-81	2	1.25	6	3.75	8	5			
Total	120	75	40	25	160	100			

Discussion:

Epidemiological research frequently makes use of serological tests because they provide excellent sensitivity and specificity, allowing for precise estimates of prevalence [12]. For public health, it is vital to understand how HP infection affects the Libyan population, especially since its high prevalence is associated with ailments such as peptic ulcers and chronic dyspepsia [13].

Studies in seroepidemiology have shown that H. pylori infection is considered one of the most widespread bacterial infections among humans. Current estimates suggest that more than half of the global population carries this bacterium. The occurrence of this infection varies, showing rates of about 25% in developed nations and exceeding 90% in developing ones, with most cases being contracted during childhood [14].

The results of this study, revealing a 75% prevalence rate of H. pylori infection in the city of Al-Asabaa, are of significant importance (34 of which had positive results for both of IgG and IgM, 24 for IgM only, and 62 for IgG), as this represents the first investigation of its kind in the region. This rate indicates a high prevalence of infection, which is consistent with previous studies conducted in other Libyan cities, such as, Benghazi (71.4%) [13], and Mesllata (76.8%) [15]. This similarity in prevalence rates across different cities may be attributed to shared environmental, social, and economic factors. These include common water sources, similar levels of general sanitation, and population density, which are known to directly influence the spread of this infection. Despite these similarities, our findings show some clear differences when compared to other studies. The prevalence rate in Al-Asabaa is relatively lower than the rates reported in Al-Ajeelat (84.7%) and Sirte (83%) [16,17]. This variation may suggest the presence of local factors that limit the spread of the infection in Al-Asabaa, such as differences in health conditions, nutrition, or the genetic characteristics of the population. Conversely, our results are significantly higher than those reported in Tobruk (31.3%) [18], Tripoli (35%) [19], Zawiya (43%) [20], Benghazi (56.5%) [21] and Tarhuna (64.60%) [22]. This substantial disparity could be explained by differences in the methodologies used in the studies, variations in the target populations, or potentially a difference in levels of health awareness and access to medical care among these cities.

Regarding gender, our results indicated no statistically significant differences in the prevalence of H. pylori infection between males (36.25%) and females (38.75%), with a p-value of (0.715). The findings of this study are consistent with those of the Mesllata study, which reported no statistically significant difference in seroprevalence between females (80.9%) and males (70.4%) [15]. Similarly, a Benghazi study indicated that both genders seem to be equally susceptible to the infection, although a slightly higher percentage was noted in females (58.4%) compared to males (41.6%) [21]. These results align with other studies that found no gender differences, such as those from Tobruk and Tripoli [18,19]. In contrast, our results differ from the Al-Ajeilat study, which found a statistically significant difference in prevalence between genders, with a rate of (29.7%) for males and (70.3%) for females [16]. The role of gender in H. pylori prevalence remains uncertain and varies, yet it is increasingly recognized that there are substantial gender differences in many diseases.

For age, the current study showed a statistically significant relationship between age and H. pylori infection, with a p-value of (0.0089). The highest prevalence was found in the age groups 22–41 years (27.5%) and 2–21 years (26.25%) for both genders. Similarly, a study conducted in Libya found the same trend for infection in these age groups. Furthermore, the prevalence of H. pylori infection in the current study decreased with advancing age, particularly in the 62–81-year age group. This result is consistent with a study conducted in Tripoli, which found a sharp decrease in the percentage of H. pylori infection in the 60–69 and 80–89 years age groups [19]. This could be explained by the limited number of older participants and may be due to a weakened serological response in the elderly and/or a decrease in the number of microorganisms resulting from gastric atrophy. In contrast, other studies in Libyan cities such as Mesllata, Al-Ajeilat, and Benghazi found no statistically significant relationship between age and infection [15,16, 21].

Conclusions and Recommendations:

This study concluded that the prevalence of H. pylori is significantly high in the city of Al-Asabaa, reaching 75% of the total sample studied. This rate was confirmed by detecting antibody levels in the serum. The results showed that 34 of the positive cases had both IgM and IgG antibodies, while 24 cases were positive for IgM only, and 62 cases were positive for IgG only. This distribution indicates the presence of both recent (IgM positive) and chronic (IgG positive) infections, confirming the continuous spread of the bacterium in the community.

The results also showed a statistically significant relationship between the prevalence of H. pylori infection and age groups, with the highest infection rates recorded in the younger age groups (2-21 years and 22-41 years). Conversely, the study found no statistically significant relationship between the infection's prevalence and gender, which aligns with the results of many previous studies in different regions.

Based on these findings, the study recommends the importance of health awareness and the need to take preventive measures to reduce the spread of this bacterium, especially in the more susceptible age groups. It also recommends conducting further future studies to understand the genetic and environmental factors that may influence the varying prevalence rates in Libyan cities.

References:

[1] Sharndama, H. C., &Mba, I. E. (2022). Helicobacter pylori: An up-to-date overview on the virulence and pathogenesis mechanisms. Brazilian Journal of Microbiology, 53(1), 33–50.

[2] Atia, A., Abuagela, M., Abdulwahed, E., Jerbi, R., Alwaseea, N., Ahmed, F., Alaqeli, E., Ashur, A. B., El Magrahi, H., &Mousa, A. (2023). Seroprevalence of Helicobacter pylori Infection in Tripoli, Libya. Mustansiriya Medical Journal, 22(1), 68–70.

[3]. Eshraghian, A. (2014). Epidemiology of Helicobacter pylori infection among the healthy population in Iran and countries of the Eastern Mediterranean Region: a systematic review of prevalence and risk factors. World Journal of Gastroenterology, 20(46), 17618–17625.

[4]. Mahdawi, N., Karim, I., Abdulazez, Z., ALmsagrei, N., &Alaswad, N. (2024). Study of Correlation between H. pylori, Life Habits, and Risk Factors among Adult Patients in Gharyan, Libya. Alqalam Journal of Medical and Applied Sciences, 8(1), 1141–1145.
[5]. Ernst, P. B., & Gold, B. D. (2000). The disease spectrum of Helicobacter pylori: the immunopathogenesis of gastroduodenal ulcer and gastric cancer. Annual Review of Microbiology, 54, 615–640.
[6]. Khalleefah, M., Hasen, Y., Elfituri, Z., Edeeb, M., &Alreeshi, K. (2023). Prevalence of H. pylori Infection among Patients with Chronic Gastric Symptoms and The Role of Gastric Biopsy in its Diagnosis and Management. AlQalam Journal of Medical and Applied Sciences, 7(2), 788–793.
[7]. Ahmad, A., Govil, Y., & Frank, B. B. (2003). Gastric mucosa-associated lymphoid tissue lymphoma. The American Journal of Gastroenterology, 98(5), 975–986.
[8]. Chen, J., Bu, X. L., Wang, Q. Y., Hu, P. J., & Chen, M. H. (2007). Decreasing seroprevalence of Helicobacter pylori infection during 1993-2003 in Guangzhou, southern China. Helicobacter, 12(2), 164–169.
[9]. Payão, S. L., & Rasmussen, L. T. (2016). Helicobacter pylori and its reservoirs: A correlation with the gastric infection. World Journal of Gastrointestinal Pharmacology and Therapeutics, 7(1), 126–132.
[10]. Mégraud, F. (1993). Epidemiology of Helicobacter pylori infection. Gastroenterology Clinics of North America, 22(1), 73–88.
[11]. Andersen, L. P., Rosenstock, S. J., Bonnevie, O., &Jørgensen, T. (1996). Seroprevalance of immunoglobinG, M and an antibody to Helicobacter pylori in an unselected Danish population. American Journal of Epidemiology, 143(11), 1157–1164.
[12]. Feldman, R. A., & Evans, S. J. (1995). Accuracy of diagnostic methods used for epidemiological studies of Helicobacter pylori. Alimentary Pharmacology & Therapeutics, 9(Suppl 2), 21–31.
[13]. Mohammad, M., ALTayar, M., Toboli, A., &Bakka, A. (2011). Characteistics of Helicobacter Pylori Infection in Libyan healthy peoples in two teaching hospitals in Benghazi. Medical Journal of Islamic World Academy of Sciences, 19(1), 27–32.
[14]. Kusters, J. G., van Vliet, A. H. M., &Kuipers, E. J. (2006). Pathogenesis of Helicobacter pylori Infection. Clinical Microbiology Reviews, 19(3), 449–490.
[15]. Ajedi, A. S. S., Mohamed, A. A., & Mohamed, S. A. (2022). Sero-prevalence of Helicobacter pylori in Libyan patient with gastroenteritis. ResearchGate.
[16] Salem, S., Albahi, K., &Oun, E. (2025). Prevalence of Helicobacter Pylori Infection in Relation to Gender and Age in the Population of AL-Ajailat, Libya. Libyan Medical Journal, 17(1), 52–56.
[17] Abdallah, A. A., Abdallah, A. M., Adabos, H. A., Alfughi, F. M., Alis, N. M., Said, A. A., &Majduob, M. J. (2021). Study to determine the prevalence of Helicobacter pylori infection among the Sirte population (Libya) using an Antibody Rapid Test Cassette method. Libyan Journal of Science & Technology, 13(1), 1–4.
[18]. Bougafa, F., Amhamed, A., Hayder, A., & El Shreefi, A. (2025). Seasonal Variation in The Frequency of Helicobacter Pylori Infection in Tobruk City, Libya. Libyan Medical Journal, 17(1), 87–92.
[19]. Altyar, I. A., Abdalla, A. M., Abdalwahab, S. S., &Abdalwahab, S. S. (2015). The Seroprevalence of Helicobacter pylori Infection in Tripoli (Libya). Nature and Science, 13(1), 81–86.
[20]. Almrabet, W., Elazomi, A., Araibi, E., Shebani, B., Alrandu, F., Kasheem, R., Shawesh, F., Mohamed, A. A., Nami, A., &Bahroun, S. (2019). The prevalence of Helicobacter pylori infections and the assessment of some related factors among medical technology students. *European Journal of Pharmaceutical and Medical Research*, *6*(12), 529–535.
[21]. Almehdawi, K. A., & Ali, R. H. (2016). The Prevalence of Helicobacter Pylori Infection in Benghazi, Libya. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), 15(7), 73–77.
[22]. Azbida, A. G., Abdlmola, T. O., Aboubakr, R., Isweesi, A., Alsharif, S., Abdulqadir, A., &Abdulali, R. (2023). Seroprevalence of Helicobacter pylori in Tarhuna district, Libya "Students of Medical technology faculty - AzzaytunaUniversi-ty as a model". BaniWalid University Journal of Humanities and Applied Sciences,8 (4), 138-151.