Risk factors and diagnostic methods of H. pylori in Saudi Arabia

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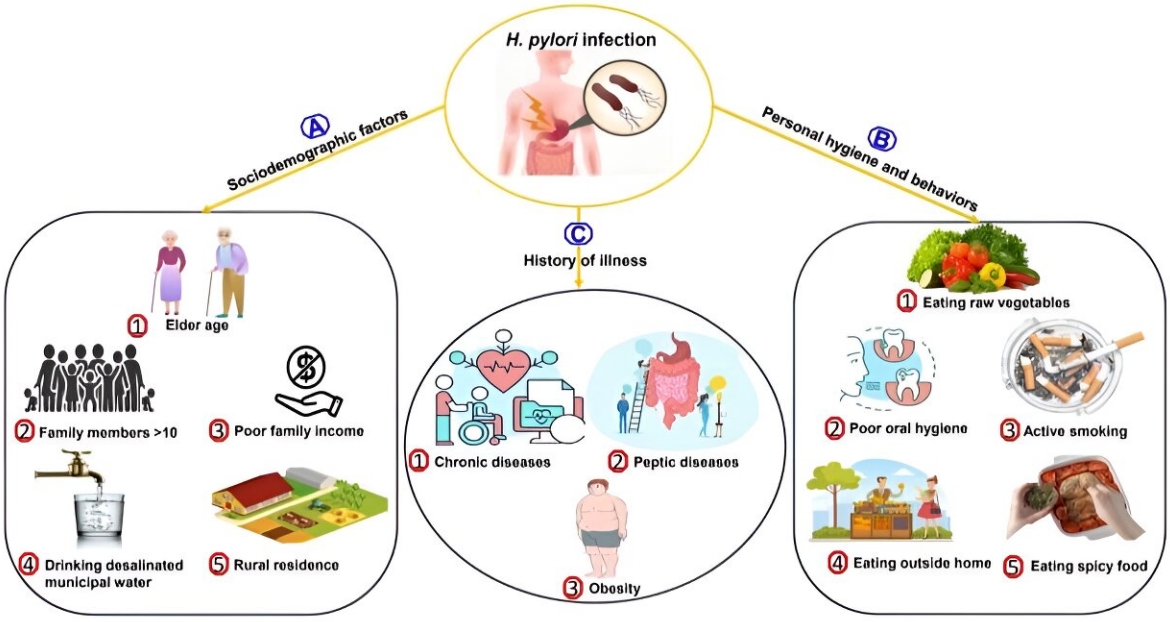

The most common risk factors associated with H.pylori infection in Saudi Arabia. Credit: Biomolecules and Biomedicine

Dr. Mutasim E. Ibrahim from the University of Bisha, Saudi Arabia, has recently conducted an extensive study on Helicobacter pylori (H. pylori), published in *Biomolecules and Biomedicine*, which brings new insights into its epidemiology, pathogenicity, risk factors, and treatment methodologies.

Inhabiting the gastric mucosa, H. pylori affects approximately half of the global population and is implicated in various gastroduodenal diseases, including chronic active gastritis, peptic ulcerations, and, in severe cases, malignant transformations.

Epidemiological significance, risk factors and regional disparities

H. pylori, first identified in 1983, is now recognized as a leading gastric microbial pathogen. Dr. Ibrahim's study highlights its significant role in a range of gastroduodenal diseases, noting that its prevalence in Saudi Arabia varies from 10% to 96%, depending on regional demographics.

To conduct this comprehensive analysis, Dr. Ibrahim searched the PubMed database, focusing on literature pertaining to H. pylori infection in Saudi Arabia from January 1990 to December 2022. This thorough exploration, based on specific Medical Subject Headings (MeSH), resulted in the collection of 97 pertinent articles, each contributing valuable knowledge to this field.

The wide variability in infection rates underscores the need for tailored public health strategies to address regional differences. This localized approach offers a unique perspective, contrasting with broader bibliographic reviews that encompass findings from other regions.

The study identifies key risk factors for H. pylori infection, such as socioeconomic status (including lower income), medical history, personal hygiene, and specific dietary habits like eating outside the home and drinking desalinated municipal water. The research also suggests the oral cavity as a potential reservoir for H. pylori, indicating a link between poor oral hygiene and recurrent gastric infections.

Dr. Ibrahim's analysis reveals higher infection rates among obese individuals and in various geographical areas of Saudi Arabia, highlighting the need for region-specific health policies. The presence of virulence genes like cytotoxin-associated gene A (cagA) and vacuolating cytotoxin (vacA) correlates with the pathogenicity of H. pylori and the clinical manifestations of the diseases it causes.

H. pylori's colonization of the gastric mucosa typically begins in childhood and persists into adulthood unless actively treated. Its role in the development of peptic ulcers and other severe conditions contributes significantly to health care costs, with peptic ulcer diseases alone costing an estimated $6 billion annually in the United States.

The study emphasizes significant regional disparities in the prevalence of H. pylori infection across Saudi Arabia, with variations noted in the central, southern, western, and eastern regions. This highlights the complex nature of the infection's spread and the influence of regional factors. In the southern region, studies report prevalence rates of up to 67% in Aseer and 54.9% in Jazan. The central region, which includes Riyadh and Qassim, shows similarly high prevalence rates, with more than 70% in adults in Riyadh and varied rates across different demographic groups and disease conditions.

In the western region, encompassing the populous areas of Makkah and Al-Madinah, diverse prevalence rates are observed, with studies underscoring the significant impact of H. pylori on various gastric disorders. In the eastern region, high prevalence rates are noted among patients with comorbidities, such as those undergoing bariatric surgery or with chronic renal issues, indicating the need for targeted health care interventions in these areas.

Diagnostic techniques

Dr. Ibrahim categorizes diagnostic methods for H. pylori into invasive and non-invasive techniques. Invasive methods like endoscopy and PCR assays are essential for accurate diagnosis but can be limited by their invasive nature. In contrast, non-invasive methods such as stool antigen tests and urea breath tests are noted for their ease of use and safety, particularly suitable for children and patients who cannot undergo invasive procedures.

The choice of these diagnostic methods is influenced by factors including resource availability, cost, patient age, gastric symptoms, and the specific clinical information sought. Culturing the bacteria, though more complex, is crucial for determining its antimicrobial susceptibility profile.

A critical challenge: Antibiotic resistance

The study highlights the emergence of resistant strains of H. pylori in various regional settings as a significant challenge. This increasing resistance complicates treatment efforts, making it imperative to assess local antimicrobial resistance rates before formulating effective treatment strategies. The global decline in the efficacy of traditional triple therapy, primarily due to resistance to antibiotics like clarithromycin and metronidazole, is also noted.

Dr. Ibrahim advocates for treatment strategies based on local antimicrobial susceptibility patterns, underlining the potential effectiveness of levofloxacin-based regimens and sequential therapy, along with a combination of effective antibiotics with low resistance rates.

Future directions and public health implications

In concluding remarks, Dr. Ibrahim calls for ongoing research to deepen the understanding of the role of virulence genes in the severity of infections and the development of gastric carcinoma. The study highlights the importance of early diagnosis and the adoption of appropriate treatment strategies. Implementing screening and prevention strategies for H. pylori, along with enhancing public awareness and hygiene practices, are emphasized as vital measures.

The study also brings light on H. pylori's role in causing local and systemic inflammation, leading to gastrointestinal and extra-GIT illnesses. The importance of its virulence factors, particularly vacA and cagA, in determining the severity of various upper gastrointestinal tract diseases, is highlighted. These factors are instrumental in identifying high-risk patients for gastroduodenal diseases.

Furthermore, the study points to the importance of evaluating local antibiotic resistance patterns in Saudi Arabia before implementing H. pylori treatment protocols, a crucial step to optimize treatment success and combat infection and related complications effectively.

Mutasim E. Ibrahim's comprehensive review on H. pylori infection in Saudi Arabia stands as a significant contribution to the global understanding of this widespread pathogen. His findings provide invaluable insights for health care providers, policymakers, and researchers, guiding the development of more effective strategies for managing and preventing H. pylori infection, not only in Saudi Arabia but also in other regions facing similar challenges.

More information: Mutasim E. Ibrahim, Epidemiology, pathogenicity, risk factors, and management of Helicobacter pylori infection in Saudi Arabia, *Biomolecules and Biomedicine* (2023). DOI: 10.17305/bb.2023.9575