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Review Article

Research progress on the prevalence and influencing factors of Helicobacter pylori infection

Qingmei Xu, Minzhen Qin*

[1] *Affiliated Southwest Hospital of Youjiang Medical University for Nationalities, Baise 533000, Guangxi Zhuang Autonomous Region, China..*

Abstract Helicobacter pylori (Hp) is a bacterium capable of colonizing the human gastric mucosa. According to the Kyoto Global Consensus Report on H. pylori Gastritis (2015) and the *Maastricht V/Florence Consensus Report (2016)*, Hp infection is defined as an infectious disease, with a global infection rate as high as 50%, affecting approximately 4.4 billion people worldwide. Hp is associated with both digestive and non-digestive diseases. Eradication of Hp can effectively control disease progression and reduce the risk of related conditions. This article reviews recent advances in research on the epidemiological status and influencing factors of Hp infection.

Keywords: Helicobacter pylori; infection; epidemiological status; influencing factors

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Introduction

Hp is a spiral-shaped, Gram-negative bacterium that colonizes the human gastric mucosa [1]. Since its first discovery in 1982, Hp has been confirmed to be closely associated with various gastric diseases, including chronic gastritis, peptic ulcers, gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric cancer [2]. As early as 1994, the World Health Organization (WHO) classified Hp as a Group I carcinogen, highlighting its significant role in gastric carcinogenesis [3]. In addition to gastric diseases, Hp infection is also linked to multiple extra-gastric conditions, such as cardiovascular diseases, hematological disorders, and neurological diseases [4]. Therefore, Hp infection is not only a major risk factor for digestive diseases but also a significant factor affecting systemic health.

The White Paper on the Prevention and Control of Helicobacter pylori Infection in China [5] states that population-based intervention strategies for Hp infection are the most cost-effective and efficient approach to reducing the disease burden. Although detection and treatment methods for Hp have greatly improved, no effective vaccine has been developed to prevent Hp infection, and the positive infection rate remains uncontrolled. This article summarizes recent research progress on the epidemiological status and influencing factors of Hp infection to provide a reference for its prevention and control.

1. Epidemiological Status of Hp Infection

1.1 Global Epidemiological Status of Hp Infection

A meta-analysis evaluating the global prevalence of Hp infection, incorporating data from 62 countries/regions, found that over half of the world's population is infected with Hp, with significant variations between and within countries/regions [6,7]. Countries with high Hp prevalence include Nigeria (87.7%), Portugal (86.4%), Estonia (82.5%), Kazakhstan (79.5%), and Pakistan (81.0%). In contrast, countries with low prevalence include Switzerland (18.9%), Denmark (22.1%), New Zealand

*Correspondence:.Minzhen Qin, Department of Neurology, Affiliated Southwest Hospital of Youjiang Medical University for Nationalities, Baise 533000, Guangxi Zhuang Autonomous Region, China.. Email: qinminzhen@126.com

(24.0%), Australia (24.6%), and Sweden (26.2%). Regions with high prevalence include Africa (70.1%), South America (69.4%), and Western Asia (66.6%), while low-prevalence regions include North America (37.1%), Western Europe (34.3%), and Oceania (24.4%). The infection rate in developing countries (50.8%) is higher than in developed countries (34.7%) [6]. A study summarizing global Hp infection trends over the past 40 years [8] reported a decline in global prevalence from 58.2% (1980–1990) to 43.1% (2011–2022), with the most significant reduction observed in the WHO African Region, possibly due to improved economic and sanitary conditions limiting transmission.

1.2 Epidemiological Status of Hp Infection in China

An epidemiological survey conducted between 2002 and 2004 [9] reported an Hp infection rate of 56.2% in China, with regional variations: Central China > Eastern China ≈ Western China > Southern China > Northern China. Among provinces, Guangdong had the lowest infection rate (42%), while Tibet had the highest (84%). Although the prevalence of Hp in mainland China has shown a declining trend, the rate of decline remains slow. A 2020 study [10] estimated China's Hp infection rate at 49.6%, with higher rates in the Northwest (51.8%), East (47.7%), and Southwest (46.6%). A 2022 meta-analysis [11] reported a national infection rate of 43.7%.

2. Influencing Factors of Hp Infection

2.1 Sociodemographic Factors

2.1.1 Age and Hp Infection

The relationship between age and Hp infection remains controversial. Some studies suggest no correlation [12], while others indicate that increasing age is a significant risk factor due to greater social activity and exposure [13,14]. Conversely, some research suggests that age may be a protective factor [15], possibly due to improved hygiene awareness and dining habits in older populations.

2.1.2 Gender and Hp Infection

The association between gender and Hp infection is also debated. Some studies report no significant difference [16], while others, such as Yang Yumei et al. [17], found higher infection rates in males. Potential explanations include differences in estrogen levels affecting homocysteine metabolism [18] or lifestyle factors such as smoking, alcohol consumption, and frequent dining out among males [19]. Notably, gastric adenocarcinoma (a severe consequence of Hp infection) is more prevalent in males, though chronic gastritis shows no gender disparity [20].

2.1.3 Ethnicity and Hp Infection

Multiple studies indicate ethnic disparities in Hp infection rates, with minority populations at higher risk [21]. In Chengdu, the infection rate among ethnic minorities (46.9%) was significantly higher than among Han Chinese (36.7%) [17]. Similar findings were reported in Tibetan populations [22], possibly due to differences in lifestyle, diet, and household customs.

2.2 Lifestyle Factors

2.2.1 Smoking, Alcohol, and Hp Infection

Some studies identify smoking and alcohol as risk factors [19,23], as they damage gastric mucosa and reduce defensive capacity [24,25]. However, other studies found no association [26], possibly due to inconsistent definitions of smoking/alcohol consumption levels [27]. Further research with controlled variables is needed.

2.2.2 Dietary Habits and Hp Infection

Consumption of untreated water [28,29], raw dairy products, vegetables, and salads contaminated with Hp [30,31] increases infection risk. Frequent dining out,

unhygienic eating environments, and shared meals may facilitate transmission [33]. High-salt, spicy, pickled foods, and coffee are risk factors [34], while vitamin-rich foods, garlic, legumes, and fruits are protective [35]. Public health education should promote hygienic dining practices and balanced diets.

2.3 Psychological Stress and Hp Infection

Psychological factors, such as anxiety and depression, are linked to Hp infection [36–40]. Chronic stress disrupts immune function, increasing susceptibility to infection. Poor sleep quality and insomnia are also associated with higher Hp infection rates [41,42]. Additionally, Hp infection itself is a risk factor for multiple systemic diseases [43].

Conclusion

Hp infection poses a significant public health threat in China. Despite extensive research since its discovery, its transmission mechanisms remain unclear, and no vaccine is available. Investigating the relationship between Hp infection, lifestyle factors, and risk factors can inform effective prevention strategies.

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Conflict of Interest

None.

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References

1. Malfertheiner P, Camargo M C, El-Omar E, et al. Helicobacter pylori infection.[J]. Nature reviews. Disease primers, 2023, 9 (1) : 19.
2. Sugano K, Tack J, Kuipers E J, et al. Kyoto global consensus report on Helicobacter pylori gastritis.[J]. Gut, (2015 (9) : 1353-1367.
3. Endoh K, Leung F W. Effects of smoking and nicotine on the gastric mucosa: a review of clinical and experimental evidence.[J]. Gastroenterology, 1994,107(3):864-878.
4. Huang Cuixiang, Chen Xi, Bao Yu, et al. Research Progress on the Relationship between Helicobacter pylori and Gastrointestinal and Extragastrointestinal Diseases [J]. Chongqing Medical Journal, 2022,51(17):3029-3033.
5. Zhang Jianzhong. Key Points Interpretation of the White Paper on the Prevention and Control of Helicobacter pylori Infection in China [J]. Chinese Journal of Integrated Traditional Chinese and Western Medicine on Gastroenterology, 2024,32(04):279-282.
6. Hooi J K Y, Lai W Y, Ng W K, et al. Global Prevalence of Helicobacter pylori Infection: Systematic Review and Meta-Analysis.[J]. Gastroenterology, 2017,153(2):420-429.
7. Zamani M, Ebrahimtabar F, Zamani V, et al. Systematic review with meta-analysis: the worldwide prevalence of Helicobacter pylori infection.[J]. Alimentary pharmacology & therapeutics, 2018,47 (7) : 868-876.
8. Li Y, Choi H, Leung K, et al. Global prevalence of Helicobacter pylori infection between 1980 and 2022: a systematic review and meta-analysis.[J]. The lancet. Gastroenterology & hepatology, 2023,8(6):553-564.
9. Zhang Wendai, Hu Fulian, Xiao Shudong, et al. Epidemiological investigation of Helicobacter pylori infection in the natural population of China [J]. Modern Gastroenterology and Interventional Diagnosis and Treatment, 2010,15(05):265-270.
10. Li M, Sun Y, Yang J, A systematic review and meta-analysis.[J]. Helicobacter, 2020,25(5):e12729.
11. Lu T, Zhang J, Li S, et al. Spatial-temporal Distribution and Influencing Factors of Helicobacter pylori Infection in Chinese Mainland, 2001-2020: A Systematic Review and

Meta-Analysis.[J]. Journal of clinical gastroenterology, 2022,56(5):e273-e282.

12. Wang Xiaomei Epidemiological investigation of Helicobacter pylori infection in the natural population in Southern Jiangxi Region [J]. Chinese Journal of Ethnic and Folk Medicine, 2013,22(18):35-37.
13. Xiao Yifeng, Cao Wei. Epidemiological Investigation and Related Factors of Helicobacter pylori Infection in 2100 Young and Middle-aged People [J]. Guizhou Medicine, 2021,45(08):1256-1257.
14. Zhou Liuliu, Guo Fengjian, Shi Yangli, et al. Investigation on the Infection Rate of Helicobacter pylori in the Eastern Area of Chongming and Logistic Regression Analysis of Its Risk Factors [J] Journal of Tropical Medicine, 2022,22(07):1010-1013.
15. Lei Rong, Yang Dan, Yuan Fangtao, et al. Analysis of Helicobacter pylori infection and Related Risk Factors in 10,661 Physical Examination subjects [J]. Basic Medicine and Clinical Practice, 2022,42(01):126-130.
16. Xue Jianhua, You Aijun, Xu Zhiyue, et al. Study on the Relationship between Helicobacter pylori Infection and Lifestyle and Risk Factors in Occupational Physical Examination Population in Shanghai Area [J] Modern Preventive Medicine, 2022,49(03):404-410.
17. Yang Yumei, Liu Yuping, Wang Lin, et al. Analysis of the Current Situation and Risk Factors of Helicobacter pylori Infection among Residents in Chengdu Area [J]. Modern Preventive Medicine, 2020,47(17):3220-3224.
18. Wei Wenzhi, Liu Yanru, Wen Xiaohua, et al. The Relationship between Helicobacter pylori Infection and Hyperhomocysteinemia in the Population undergoing Health Check-ups [J] Chinese Journal of Health Care Medicine, 2018,20(01):7-9.
19. Xie Chunxiao, Ni Dongkui. The effects of smoking, drinking and their interactions on Helicobacter pylori infection [J]. Journal of Tianjin Medical University, 24,30(03):255-259.
20. Derakhshan M H, Liptrot S, Paul J, et al. Oesophageal and gastric intestinal-type adenocarcinomas show the same male predominance due to a 17 year delayed development in females.[J]. Gut, 2009,58(1):16-23.
21. Bai D, Liu K, Wang R, et al. Prevalence Difference of Helicobacter pylori Infection Between Tibetan and Han Ethnics in China: A Meta-analysis on Epidemiologic Studies (SIGES).[J]. Asia-Pacific journal of public health, 2023,35(2-3):103-111.
22. Liu Linmin, Yu Zhen, Ciren Yangjin, et al. Investigation on Helicobacter pylori Infection Status in Children in Lhasa Area [J]. Modern Gastroenterology and Interventional Diagnosis and Treatment, 2022,27(06):731-734.
23. Liu Xuexin, Wu Xiaoqian, Wang Xiaoxi, et al. Correlation Analysis between Smoking and Helicobacter pylori Infection in Physical examination Subjects of a Hospital in Hebei Province in 2023 [J]. Disease Surveillance, 2024,39(07):924-928.
24. Xue Jianhua, Yu Haiping. Research progress on the epidemic status and risky lifestyles of Helicobacter pylori infection [J]. Health Education and Health Promotion, 2021,16(4):378-382.
25. Xie Chunxiao, Ni Dongkui. The effects of smoking, drinking and their interactions on Helicobacter pylori infection [J]. Journal of Tianjin Medical University, 24,30(03):255-259.
26. Zhou Liuliu, Guo Fengjian, Shi Yangli, et al. Investigation on the Infection Rate of Helicobacter pylori in the Eastern Area of Chongming and Logistic Regression Analysis of Its Risk Factors [J] Journal of Tropical Medicine, 2022,22(07):1010-1013.
27. Mo Lirong Investigation on the Current Situation of Helicobacter pylori Infection and Analysis of Related Factors in the Population of Wuzhong Area, Ningxia [D] Ningxia Medical University, 2019.
28. Fang Ling Investigation on Helicobacter pylori Infection and Related Factors among Physical Examination Population in Shenzhen City [D]. Shantou University, 2011.
29. Hu D, Shao J, Wang L, et al. Prevalence and risk factors of Helicobacter pylori infection in Chinese maritime workers.[J]. Annals of human biology, 2013,40(6):472-476.
30. Fujimura S, Kawamura T, Kato S, Detection of Helicobacter pylori in cow's milk.[J]. Letters in applied microbiology, 2002,35(6):504-507.
31. Angelidis A S, Tirodimos I, Bobos M, et al. Detection of Helicobacter pylori in raw bovine milk by fluorescence in situ hybridization (FISH).[J]. International journal of food microbiology, 2011,151(2):252-256.
32. Assaad S, Chaaban R, Tannous F, et al. Dietary habits and Helicobacter pylori infection: a cross sectional study at a Lebanese hospital.[J]. BMC gastroenterology, 2018,18(1):48.
33. Han Ying, Xu Qingzhi, Liu Yunxiang, et al. Analysis of Influencing Factors of Helicobacter pylori Infection in Health Checkup Population and Its Relationship with Pepsinogen and Carotid Atherosclerosis [J] Advances in Modern Biomedical Science, 2022,22(20):3852-3858.
34. Khasag O, Boldbaatar G, Tegshee T, et al. The prevalence of

Helicobacter pylori infection and other risk factors among Mongolian dyspeptic patients who have a high incidence and mortality rate of gastric cancer.[J]. Gut pathogens, 2018,10:14.

35. Xu Liqin, Yang Qihua, Gu Jundi, et al. Investigation and Analysis of Helicobacter pylori Infection Status and Its Influencing Factors in Preschool Children [J]. Chinese Journal of Maternal and Child Health, 2020,35(07):1316-1318.
36. Yin Hao A Study on the Correlation between Helicobacter pylori Infected Individuals and Their Families and Anxiety and Depression States [D]. Central South University, 2022.
37. Shi Hui, Jia Yujie, Chen Jie, et al. The Relationship between Mental Health, Personality Traits and Immune Function in Patients with Generalized Anxiety Disorder [J] International Journal of Psychiatry, 2017,44(06):1028-1030.
38. Budzymanski J Klinopocka M. Brain-gut axis in the pathogenesis of Helicobacter pylori infection.[J]. World journal of gastroenterology 2014, 20 (18) : 5212-5225.
39. Liu Min, Luo Caifeng. Investigation and Analysis on the Mental Health Status and Sleep Quality of patients with Positive Helicobacter pylori [J]. Journal of Practical Clinical Medicine, 2019,23(11):27-31.
40. Zheng Lixiao Study on the Association between Helicobacter pylori Infection and Depressive Symptoms in Adult Population [D]. Tianjin Medical University, 2019.
41. Su Yuhua, Wang Xiang 'an. Correlation Analysis of Insomnia and Chronic Gastritis [J]. Chinese Journal of Practical Medicine, 2015,10(23):38-39
42. Chen Shaoyuan, Chen Furong, Gao Shan, et al. Study on the Correlation between Chronic Insomnia Disorder and Helicobacter pylori Infection [J]. Journal of Preventive Medicine of the People's Liberation Army, 2020,38(05):38-40.
43. Gravina A G, Zagari R M, De Musis C, et al. Helicobacter pylori and extragastric diseases: A review.[J]. World journal of gastroenterology, 2018,24(29):3204-3221.