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Contents

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META-ANALYSIS

Prevalence of *Helicobacter pylori* infection in China from 2014-2023: A systematic review and meta-analysis

Lu Xie, Guang-Wei Liu, Ya-Nan Liu, Peng-Yu Li, Xin-Ning Hu, Xin-Yi He, Rui-Bo Huan, Tai-Long Zhao, Hui-Jun Guo

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Abstract

BACKGROUND

Helicobacter pylori (H. pylori) stands as the predominant infectious agent linked to the onset of gastritis, peptic ulcer diseases, and gastric cancer (GC). Identified as the exclusive bacterial factor associated with the onset of GC, it is classified as a group 1 carcinogen by the World Health Organization. The elimination of *H. pylori* plays a crucial role in the primary prevention of GC. While the prevalence has declined in recent decades, *H. pylori* infection is still highly prevalent in China, accounting for a significant part of the disease burden of GC. Therefore, updated prevalence information for *H. pylori* infection, especially regional and demographic variations in China, is an important basis for the design of targeted strategies that will be effective for the prevention of GC and application of policies for *H. pylori* control.

AIM

To methodically evaluate the occurrence of *H. pylori* infection throughout China and establish a reference point for subsequent investigations.

METHODS

A systematic review and meta-analysis was conducted following established guidelines, as detailed in our methodology section.

RESULTS

Our review synthesized data from 152 studies, covering a sample of 763827 individuals, 314423 of whom were infected with *H. pylori*. We evaluated infection rates in mainland China and the combined prevalence of *H. pylori* was 42.8% (95%CI: 40.7-44.9). Subgroup analysis indicated the highest prevalence in Northwest China at 51.3% (95%CI: 45.6-56.9), and in Qinghai Province, the prevalence reached 60.2% (95%CI: 46.5-73.9). The urea breath test, which recorded the highest infection rate, showed a prevalence of 43.7% (95%CI: 41.4-46.0). No notable differences in infection rates were observed between genders. Notably, the prevalence among the elderly was significantly higher at 44.5% (95%CI: 41.9-47.1), compared to children, who showed a prevalence of 27.5% (95%CI: 19.58-34.7).

CONCLUSION

Between 2014 and 2023, the prevalence of *H. pylori* infection in China decreased to 42.8%, down from the previous decade. However, the infection rates vary considerably across different geographical areas, among various populations, and by detection methods employed.

Key Words: *Helicobacter pylori*; Meta-analysis; Prevalence; Epidemiology; China

Core Tip: Globally, *Helicobacter pylori* infection continues to be the most prevalent infectious disease, posing substantial public health challenges. Despite a reduction in overall prevalence to 42.8% over the past decade, high rates persist in specific areas and demographics within China, necessitating continued vigilance and targeted interventions.

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INTRODUCTION

The presence of *Helicobacter pylori (H. pylori)* infection is linked to various gastrointestinal conditions and serves as the primary etiological agent for chronic gastritis, peptic ulcers, and gastric cancer (GC). The condition impacts approximately 4.4 billion individuals globally, representing a prevalence rate of around 48.5%, thus posing a significant public health issue on a global scale[1]. In the year 2020, global cancer statistics indicated that there were approximately 1013103 new instances of GC, which corresponded to 768793 fatalities across the globe. Notably, China accounted for 478508 of these new cases and 373706 of the deaths recorded[2]. The occurrence of GC in China is 28.68 per 100000, placing it third among cancers, following lung and colon cancers[3], and it remains a significant contributor to cancer mortality. Despite advancements in sanitation and living conditions, China continues to face a significant prevalence of *H. pylori* infection and GC. The elimination of *H. pylori* has been shown to markedly decrease immune and inflammatory responses, promote ulcer healing, and diminish the likelihood of GC development. Long-term studies from Linqu County of Shandong Province and Matsu Island of Taiwan have demonstrated reductions in GC risk by 52% and 53%, respectively, after *H. pylori* eradication[4,5]. A vast country, China presents a huge variation in geographic, environmental, and socioeconomic aspects of the country; hence, its prevalence rates for diseases also vary significantly amongst its regions. The National Cancer Center, the Cancer Hospital of the Chinese Academy of Medical Sciences, and Peking Union Medical College of China have all documented regional differences in cancer incidence[6]. For example, Qinghai Province exhibits the highest incidence rate of GC in the nation, while Hubei Province is positioned sixth. It is crucial to tailor prevention and treatment strategies to China's unique national circumstances, including the specific epidemiological disease profiles and the diverse needs of various regions and demographics. This is vital for decelerating disease progression and minimizing premature mortality due to end-stage events[7]. Examining the impact of *H. pylori* infections on disease burden is crucial for formulating national policies[8]. In this research, a meta-analysis approach will be employed, utilizing evidence-based methods with individual rental rates to examine the infection rate within the general population of China. The analysis aids in reliable evidence that is needed at clinical prevention and intervention strategies. The results are as follows.

MATERIALS AND METHODS

This meta-analysis was registered on the PROSPERO database (No. CRD42024555621) and carried out in compliance with the Preferred Items for Systematic Reviews and Meta-Analysis standards.

Search strategy

A systematic review of literature was performed using six databases: (1) PubMed; (2) EMBASE; (3) Cochrane Library; (4) China National Knowledge Infrastructure; (5) Wanfang; and (6) Cqvip, covering the period from January 1, 2014, to January 1, 2024 (Supplementary Table 1).

Inclusion criteria and exclusion criteria

The inclusion criteria were as follows: (1) Patients diagnosed with *H. pylori* infection *via* urea breath test (UBT), serological antibody test, stool antigen detection, endoscopic examination, or histopathological evaluation of gastric mucosa biopsies; (2) Studies with clearly defined time and location, involving subjects confirmed to be Chinese; (3) Studies where the infection rate was explicitly stated or could be calculated; and (4) Research findings disseminated in either Chinese or English.

The criteria for exclusion encompassed: (1) Intervention trials, reviews, conference papers, case reports, and meta-analyses; (2) Studies with questionable or incorrect data; (3) Duplicate studies; and (4) Studies with sample sizes less than 50. Literature management was facilitated using Endnote 9.1 software. Two researchers worked separately to search for and screen literature; when they disagreed, they consulted an expert third party to settle the dispute.

Data extraction and quality assessment

Two researchers worked separately to retrieve the data using an Excel spreadsheet. The first author, publication year, study site, geographical area, sample size, and gender distribution of participants were among the data points retrieved. A third researcher resolved any disagreements, and the studies were assessed according to the Loney criterion[9]. Details of these quality assessments are presented in Supplementary Table 2[10-160].

Statistical analysis

The occurrence of *H. pylori* infection was assessed *via* meta-analysis. The variation among the studies was evaluated through the application of Cochran's Q statistic and the I-square statistics (I^2). The random-effects model was utilized to calculate the pooled prevalence along with its 95%CI. Sensitivity and subgroup analyses were conducted to further investigate heterogeneity and validate the robustness of the study findings. The subgroup analyses examined the prevalence of *H. pylori* by province, municipality, autonomous region, geographical area, gender, age, and detection method. Meta-analyses were conducted in RStudio using the "metaprop()" function. Funnel plots were created with the "metabias()" function, and asymmetry was evaluated using the AS-Thompson test[161]. All statistical tests were two-sided, with statistical significance set at $P < 0.05$.

RESULTS

Literature search and screening results

Figure 1 shows the steps involved in searching for and screening literature. The original list of books included 6430 items; 929 of those were later eliminated due to duplication. We removed 5042 results after going over their titles and abstracts. A detailed review of 459 publications was conducted, resulting in 151 studies being selected for inclusion.

Basic characteristics of included literature

This analysis involved 152 studies, with a cumulative sample size of 763827 participants. Zou *et al*[10] presented two studies meeting the inclusion criteria within a single publication. As a result, the table displaying the basic characteristics of the included literature (Table 1) lists 152 studies, whereas the referenced literature totals 151 articles. The study encompassed thirty provinces, municipalities, and autonomous regions across mainland China, with Zhejiang Province (n = 12), Guangdong Province (n = 10), and Hubei Province (n = 9) recording the highest number of studies. Heilongjiang province was excluded due to the lack of studies that met the inclusion criteria during the search period. East China recorded the most studies (n = 43) among the seven geographic regions, while Northeast China had the fewest (n = 6) (Table 1)[10-160].

The pooled prevalence of *H. pylori* in Mainland China

The prevalence of *H. pylori* infection was analyzed in 152 studies. The heterogeneity test produced an I^2 = 99.7%, P < 0.001, necessitating the use of a random-effects model. The combined findings suggest that the prevalence of *H. pylori* infection in China from 2014 to 2023 stood at 42.8% (95%CI: 40.7-44.9). The corresponding forest plot is shown in Supplementary Figure 1[10-160].

Subgroup analysis

Owing to substantial heterogeneity among the studies, prevalence rates were separately analyzed based on province,

Table 1 Characteristics of the included studies

Ref.	Year	Type of study	Region	Data collection time	Detection methods	Age (range/mean ± SD)	Simple size	Male	Positive (male/female)	Prevalence	95%CI
North East											
Zhang *et al*[11]	2016	Cross-sectional	Jilin (Jilin Province)	2014.11-2024.12	2	21-60	1932	44.77	293/395	35.6	33.5-37.8
Wang *et al*[12]	2014	Cross-sectional	Changchun (Jilin Province)	2012.05-2012.12	1	22-83	1059	65.06	324/138	43.6	40.6-46.7
Zhang *et al*[13]	2014	Cross-sectional	Shenyang (Liaoning Province)	2012.04-2012.06	2	3-6	1150	52.00	79/72	13.1	11.2-15.2
Zhu *et al*[14]	2020	Cross-sectional	Jinzhou (Liaoning Province)	2019.02-2019.04	1	21-61	2859	77.86	792/166	33.5	31.8-35.3
Jiang *et al*[15]	2015	Cross-sectional	Dalian (Liaoning Province)	2012.12-2013.11	2	1-100	4127	53.62	664/591	30.4	29.0-31.8
Ji and Gu[16]	2016	Cross-sectional	Dalian (Liaoning Province)	2013.09-2015.09	2	18-88	4214	47.51	480/437	21.8	20.5-23.0
North China											
Zheng *et al*[17]	2022	Cross-sectional	Tangshan (Hebei Province)	2019.07-2020.09	1	21-78	9944	67.09	3115/1395	45.4	44.4-46.3
Yang *et al*[18]	2020	Cross-sectional	Beijing	2013.09-2019.06	1	NA	7260	36.54	1106/1726	39.0	37.9-40.1
Zhao *et al*[19]	2017	Cross-sectional	Beijing	2009.09-2010.02	4	1 month–18 years	1196	50.67	65/62	10.6	8.9-12.5
Xi *et al* [20]	2018	Cross-sectional	Beijing	NA	4	6-13	291	55.33	47/20	23.0	18.3-28.3
Chen *et al*[21]	2016	Cross-sectional	Beijing	2012.01-2016.12	1	14-80	11000	51.65	2826/2313	46.7	45.8-47.7
Wu *et al* [22]	2014	Cross-sectional	Beijing	2010.01-2013.12	1	16-88	10331	69.29	3236/1353	44.4	43.5-45.4
Cui *et al* [23]	2020	Cross-sectional	Beijing	2018.06-2019.05	1	18-81	1058	52.65	175/163	31.9	29.1-34.9
Zhang *et al*[24]	2014	Cross-sectional	Beijing	2010	1	70.9	2006	50.10	851/822	83.4	81.7-85.0
Zhang *et al*[25]	2015	Cross-sectional	Baoding (Hebei Province)	2015	2	20-61	379	49.34	86/89	46.2	41.1-51.3
Chen *et al*[26]	2019	Cross-sectional	Hohhot (Inner Mongolia Autonomous Region)	2016-2019	1	18-81	13568	56.60	2480/1677	30.6	29.9-31.4
Wang *et al*[27]	2019	Cross-sectional	Hailar District (Inner Mongolia Autonomous Region)	2017.01-2017.12	1	7-88	15293	56.14	4232/3031	47.5	46.7-48.3
Kan *et al*[28]	2015	Cross-sectional	Chifeng (Inner Mongolia Autonomous Region)	2013.1.4-2013.5.31	2	17-91	3282	60.18	457/230	20.9	19.6-22.4
Yan *et al*[29]	2020	Cross-sectional	Chengzhi (Shanxi Province)	2019.01-2019.12	2	16-96	1224	69.61	536/259	65.0	62.2-67.6
Li *et al* [30]	2022	Cross-sectional	Shanxi Province	2019.01-2021.12	1	20-86	3365	75.99	474/197	19.9	18.6-21.3
Zhang *et al*[31]	2021	Cross-sectional	Tianjin	2017.08-2018.08	1	16-90	10000	54.09	1978/1626	36.0	35.1-37.0
East China											
Zhang	2020	Cross-	She County	NA	1	20-90	1536	39.84	389/581	63.2	60.7-

et al[32]		sectional	Tongcheng (Anhui Province)								65.6
Wang *et al*[33]	2022	Cross-sectional	Suzhou (Anhui Province)	2017.01-2020.07	1	21-85	33634	57.73	7603/5647	39.4	38.9-39.9
Peng *et al*[34]	2021	Cross-sectional	Anqing (Anhui Province)	2019.04-2019.08	2	18-92	2725	60.51	816/610	52.3	50.4-54.2
Han *et al*[35]	2021	Cohort study	Anhui Province	2017.07-2020.11	1	≥ 18	1094	67.92	329/153	44.1	41.1-47.1
Guo *et al*[36]	2019	Cross-sectional	Jieshou (Anhui Province)	2017.1-2018.12	1	18-97	9684	45.34	1356/1676	31.3	30.4-32.2
Hu *et al*[37]	2015	Cross-sectional	Fujian Province	2013.02-2013.11	2	18-76	2770	NA	1435	51.8	49.9-53.7
Xie *et al*[38]	2020	Cross-sectional	Ningde (Fujian Province)	2019.10-2020.01	3	11-83	417	55.64	135/112	59.2	54.3-64.0
Li *et al*[39]	2016	Cross-sectional	Jinjiang (Fujian Province)	2015.01-2015.12	1	17-86	8751	66.67	2640/1440	46.6	45.6-47.7
Liu *et al*[40]	2016	Cross-sectional	Xiamen (Fujian Province)	2012-2014	1	44.8 ± 12.3	1444	66.90	475/216	47.9	45.2-50.5
Chen *et al*[41]	2022	Cross-sectional	Zhangzhou (Fujian Province)	2019.09-2020.08	1	20-89	2608	54.79	655/594	47.9	46.0-49.8
Mao *et al*[42]	2017	Cross-sectional	Suzhou (Jiangsu Province)	2015.01-2015.12	1	20-80	963	77.15	333/92	44.1	41.0-47.3
Zhang *et al*[43]	2019	Cross-sectional	Nanjing (Jiangsu Province)	2017.05-2017.08	1	64.34 ± 8.32	935	34.33	126/239	35.9	32.9-39.1
Xie *et al*[44]	2017	Cross-sectional	Suzhou (Jiangsu Province)	2015.10-2016.07	1	12-93	2664	52.74	769/753	57.1	55.2-59.0
Jiang *et al*[45]	2015	Cross-sectional	Jiangsu Province	2013.01-2014.10	1	17-95	3480	62.44	949/615	44.9	43.3-46.6
Li *et al*[46]	2019	Cross-sectional	Nanjing (Jiangsu Province)	2019	1	48.75 ± 5.97	700	57.14	132/124	36.6	33.0-40.3
Wang *et al*[47]	2023	Cross-sectional	Nanjing (Jiangsu Province)	2022	1	NA	15160	54.47	2721/1906	30.5	29.8-31.3
Meng *et al*[48]	2015	Cross-sectional	Dongtai (Jiangsu Province)	2012.06-2013.6	1	29-75	1598	52.00	403/307	44.4	42.0-46.9
Ji *et al*[49]	2023	Cross-sectional	Suzhou (Jiangsu Province)	2018.1-2018.12	2	18-89	6588	64.31	2370/1339	56.3	55.1-57.5
Zhang *et al*[50]	2018	Cross-sectional	Jiuzhou (Jiangxi Province)	2015.07-2016.10	1	18-90	1200	54.92	580	48.3	45.5-51.2
Ren *et al*[51]	2020	Cross-sectional	Pingxiang (Jiangxi Province)	2016.01-2019.06	2	9-92	10487	58.81	3011/2010	47.9	46.9-48.8
Wang *et al*[52]	2017	Cross-sectional	Jiuzhou (Jiangxi Province)	2016.01-2017.03	1	43.89	6165	74.16	1689/636	37.7	36.5-38.9
Fang *et al*[53]	2021	Cross-sectional	Jingdezhen (Jiangxi Province)	2008.7-2019.12	1	6-95	48353	50.08	10462/10301	42.9	42.5-43.4
Xu *et al*[54]	2019	Cross-sectional	Cao County (Shandong Province)	2018.04-2018.07	1	18-90	1182	49.49	198/175	31.6	28.9-34.3
Shi *et al*[55]	2022	Cross-sectional	Xintai (Shandong Province)	2021.04-2022.04	1	18-84	400	52.50	106/46	38.0	33.2-43.0
Li *et al*[56]	2015	Cross-sectional	Jining (Shandong Province)	2012.05-2013.05	1, 2	16-72	580	56.03	156/106	45.2	41.1-49.3
Liang *et al*[57]	2014	Cross-sectional	Jining (Shandong Province)	2012.02-2012.12	1	16-74	4366	68.60	1690/750	55.9	54.4-57.4
Han *et al*[58]	2020	Cross-sectional	Jining (Shandong Province)	2017.01-2017.12	2	19-91	2557	69.42	782/466	57.4	55.4-59.3
Kong *et al*[59]	2022	Cohort study	Shandong Province	2021.07-2022.01	1	NA	1173	47.06	204/226	36.7	33.9-39.5

Zhang *et al*[60]	2019	Cross-sectional	Shanghai	2017.01-2018.01	1	18-90	5164	52.05	1008/869	36.3	35.0-37.7
Sun *et al* [61]	2018	Cross-sectional	Shanghai	2016.09-2016.12	2	40-93	3258	43.92	451/461	28.0	26.5-29.6
Jia *et al* [62]	2020	Cross-sectional	Shanghai	2018.10-2019.9	1	25-70	29986	59.79	11547/6033	58.6	58.1-59.2
Qiu *et al* [63]	2022	Cross-sectional	Hanghzou (Zhejiang Province)	2019.09-2019.11	1	21-69	225	54.67	31/39	31.1	25.1-37.6
Yu *et al* [64]	2018	Cross-sectional	Jiaxing (Zhejiang Province)	2016.01-2017.06	1, 3	18-80	4220	47.44	900/709	38.1	36.7-39.6
Zhou *et al*[65]	2023	Cross-sectional	Wenzhou (Zhejiang Province)	2020.01.1-2022.08.1	2	18-71	568	85.56	197/38	41.4	37.3-45.5
Zheng *et al*[66]	2015	Cross-sectional	Hanghzou (Zhejiang Province)	2013.06-2014.05	1	12-76	2220	63.96	658/309	43.6	41.5-45.7
Yang *et al*[67]	2015	Cross-sectional	Wenzhou (Zhejiang Province)	2013.10-2014.4	1	≥ 20	15817	60.79	5078/3525	56.9	56.1-57.7
Lin *et al* [68]	2014	Cross-sectional	Cangnan County (Zhejiang Province)	2007.06-2012.12	3	18-70	11986	58.06	3351	28.0	27.2-28.8
Yang *et al*[69]	2015	Cross-sectional	Taizhou (Zhejiang Province)	2011.01-2013.12	1	20-70	2072	53.28	376/336	34.4	32.3-36.5
Wang *et al*[70]	2015	Cross-sectional	Wenzhou (Zhejiang Province)	2010.04-2015.02	2	0-14	4520	NA	2118	46.9	45.4-48.3
Li *et al* [71]	2017	Cross-sectional	Anji County (Zhejiang Province)	2015.01-2016.01	4	18-80	943	51.22	242/259	53.1	49.9-56.4
Shen *et al*[72]	2014	Cross-sectional	Hanghzou (Zhejiang Province)	2012.1-2012.12	2	20-91	7911	54.25	2180/1850	50.9	49.8-52.0
He *et al* [73]	2016	Cross-sectional	Jiangshan (Zhejiang Province)	2014.05-2015.08	2	3-5	3143	50.56	390/358	23.8	22.3-25.3
Fang *et al*[74]	2022	Cross-sectional	Jinhua (Zhejiang Province)	2019.1-2021.12	2	NA	2060	50.58	542/523	51.7	49.5-53.9
Northwest China											
Yu *et al* [75]	2016	Cross-sectional	Lanzhou (Gansu Province)	2014.05-2015.07	1	16-96	3239	70.36	1197/482	51.8	50.1-53.6
Xie[76]	2021	Cross-sectional	Yuan County (Gansu Province)	2016.01-2020.01	1	12-84	2369	43.31	694/927	68.4	66.5-70.3
Zou *et al*[77]	2018	Cross-sectional	Gansu Province	2015.1-2015.12	2	27-87	1338	44.84	99/77	13.2	11.4-15.1
Qin *et al* [78]	2018	Cross-sectional	Jingtai County (Gansu Province)	2013.05-2017.06	1	≥ 14	7182	49.71	1667/1890	49.6	48.5-50.8
Wu *et al* [79]	2016	Cross-sectional	Lanzhou (Gansu Province)	2013.07-2015.06	2	18-81	442	57.24	137/89	51.1	46.4-55.9
Li[80]	2016	Cross-sectional	Zhangye County (Gansu Province)	2014.01-2015.12	1	18-83	1000	52.10	297/263	56.0	52.9-59.1
Ma *et al* [81]	2018	Cross-sectional	Baiyin (Gansu Province)	2018	1	20-70	16722	52.76	4290/2802	42.4	41.7-43.2
Hou *et al*[82]	2020	Cross-sectional	Qingyang (Gansu Province)	2016.1-2019.12	2	8-92	8321	60.06	2894/2206	61.3	60.2-62.3
Zhang *et al*[83]	2020	Cross-sectional	Yinchuan (Ningxia Hui Autonomous Region)	2018.06-2018.09	1	≥ 18	800	50.00	243/211	56.8	53.2-60.2
Hu *et al* [84]	2019	Cross-sectional	Ningxia Hui Autonomous Region	2018.12-2019.12	1	14-88	710	33.10	146/257	56.8	53.0-60.4
Li *et al* [85]	2024	Cross-sectional	Qinghai Province	2021-2022	1	3-85	1131	42.44	241/356	52.8	49.8-55.7
Li *et al* [86]	2022	Cross-sectional	Qinghai Province	2021.05-2012.12	1	4-90	4724	42.65	1047/1484	53.6	52.1-55.0

Wang *et al*[87]	2019	Cross-sectional	Qinghai Province	2017.08-2018.11	1	14-85	2103	48.64	775/784	74.1	72.2-76.0
Zhang *et al*[88]	2014	Cross-sectional	Xian (Shaanxi Province)	2014.01-2014.02	1	21-82	548	74.09	191/72	48.0	43.7-52.3
Zhang *et al*[89]	2015	Cross-sectional	Xian (Shaanxi Province)	2009-2013	2	18-70	16506	59.95	2983/1671	27.7	27.0-28.3
Tang *et al*[90]	2017	Cross-sectional	Xian (Shaanxi Province)	2016	1	18-78	6085	46.05	1463/1585	50.1	48.8-51.4
Xiao *et al*[91]	2021	Cross-sectional	Xian (Shaanxi Province)	2019.5-2020.05	1	NA	2100	60.81	600/383	46.8	44.7-49.0
Di *et al* [92]	2022	Cross-sectional	Xian (Shaanxi Province)	2016.09-2020.12	1	5-96	10016	45.06	1753/1502	32.5	31.6-33.4
Zhu *et al*[93]	2017	Cross-sectional	Hoboksar (Xinjiang Uygur Autonomous Region)	NA	1, 2	20-78	1200	43.58	362/480	70.2	67.5-72.7
Yao and Wang [94]	2017	Cross-sectional	Urumqi (Xinjiang Uygur Autonomous Region)	2016.05.10-2016.11.24	1	NA	2301	43.29	455/585	45.2	43.1-47.3
Li *et al* [95]	2023	Cross-sectional	Tarbagatay Prefecture (Xinjiang Uygur Autonomous Region)	2019.01-2022.06	2	NA	2840	50.56	846/771	56.9	55.1-58.8
Wang *et al*[96]	2016	Cross-sectional	Xinjiang Uygur Autonomous Region	2013.06-2014.06	1	17-87	4780	56.19	1264/1045	48.3	46.9-49.7
Fan *et al* [97]	2016	Cross-sectional	Xinjiang Uygur Autonomous Region	2014.09-2015.09	1	16-75	4774	41.10	1243/1890	65.6	64.3-67.0
Southwest region											
Shu[98]	2021	Cross-sectional	Tongren County (Guizhou Province)	2018.04-2019.04	1	20-60	800	56.38	252/201	56.6	53.1-60.1
Yang *et al*[99]	2019	Cross-sectional	Aba Tibetan and Qiang Autonomous Prefecture (Sichuan Province)	2015.05-2016.12	1	2-92	544	46.51	73/93	30.5	26.7-34.6
Zhou *et al*[100]	2022	Cross-sectional	Guangyuan (Sichuan Province)	2020.3-2021.03	1	18-81	4296	44.41	1140/1128	52.8	51.3-54.3
Xu *et al* [101]	2019	Cross-sectional	Luzhou (Sichuan Province)	2017.05-2018.05	1, 2	14-87	18684	63.35	3788/2086	31.4	30.8-32.1
Xiao *et al*[102]	2020	Cross-sectional	Yibin (Sichuan Province)	2017.01-2018.12	4	2-6	622	54.98	71/60	21.1	17.9-24.5
Luo *et al*[103]	2022	Cross-sectional	Nanchong (Sichuan Province)	2021.8-2022.5	1	≥ 18	1478	50.47	375/327	47.5	44.9-50.1
Zou *et al*[10]	2023	Cross-sectional	Chengdu (Sichuan Province)	2013-2014	1	NA	16914	52.49	3640/3341	41.3	40.5-42.0
Zou *et al*[10]	2023	Cross-sectional	Chengdu (Sichuan Province)	2019-2021	1	NA	18281	46.74	2570/3035	30.7	30.0-31.3
Wu *et al* [104]	2017	Cross-sectional	The Tibet Autonomous Region	NA	1, 3	2-85	4332	53.46	1475/1208	61.9	60.5-63.4
Cai *et al* [105]	2018	Cross-sectional	Lhasa (The Tibet Autonomous Region)	2015.11-2016.7	1	5-85	1000	44.30	245/331	57.6	54.5-60.7
Dawa *et al*[106]	2021	Cross-sectional	The Tibet Autonomous Region	2018-2019	1	NA	717	52.44	196/192	54.1	50.4-57.8
Zhang	2021	Cross-	Baishe (Yunnan	2020.04-	4	3-6	321	50.47	159/40	25.9	21.2-

et al [107]		sectional	Province)	2020.08							31.0
Xie[108]	2017	Cross-sectional	Qujing (Yunnang Province)	2016.1-2016.12	1	20-79	8790	58.07	1712/1172	32.8	31.8-33.8
Wang *et al*[109]	2015	Cross-sectional	Yunang Province	2013.01-2014.08	1	≥ 20	6680	72.54	1988/688	40.1	38.9-41.2
Li *et al* [110]	2018	Cross-sectional	Kunming (Yunnan Province)	2015.01-2017.12	1	20-75	606	36.63	115/75	31.4	27.7-35.2
Jia *et al* [111]	2018	Cross-sectional	Yunnan Province	2013.01-2015.02	1	21-85	1680	77.74	433/191	37.1	34.8-39.5
Fu *et al* [112]	2018	Cross-sectional	Kunming (Yunnan Province)	2013.1-2016.12	1	3-18	12932	53.15	1706/1408	24.1	23.3-24.8
Ding *et al*[113]	2017	Cross-sectional	Dali (Yunnan Province)	2014.06-2016.06	4	0-14	1127	51.46	75/53	11.4	9.6-13.4
Chen and Sun [114]	2019	Cross-sectional	Puer (Yunnan Province)	2018.5.1-2019.4.30	1	18-92	15328	56.36	3793/2502	41.1	40.3-41.9
Liu *et al* [115]	2017	Cross-sectional	Chongqing	2014.1-2014.12	1	44.1 ± 10.8	10912	52.91	1949/1801	34.4	33.5-35.3
Liu and Lei[116]	2020	Cross-sectional	Chongqing	2017.01-2018.06	1	7-18	1982	50.15	109/121	11.6	10.2-13.1
Zhou [117]	2018	Cross-sectional	Chongqing	2012.01-2016.08	1, 3	38.7	1000	54.60	324/203	52.7	49.6-55.8
Meng and Sun [118]	2018	Cross-sectional	Chongqing	2017.1-2017.12	2	15-85	27662	59.16	4222/2576	24.6	24.1-25.1
Liu and Fan [119]	2016	Cross-sectional	Chongqing	2014.01-2014.12	1	20-90	5788	65.74	1074/513	27.4	26.3-28.6
South China											
Zhu *et al*[120]	2021	Cross-sectional	Shenzhen (Guangdong Province)	2019.1-2019.12	1	20-69	985	55.53	222/164	39.2	36.1-42.3
Zhang *et al* [121]	2015	Cross-sectional	Guangzhou (Guangdong Province)	2013.07-2014.06	1	8-68	440	45.45	120/132	57.3	52.5-61.9
Liang and Yang [122]	2018	Cross-sectional	Yangjiang (Guangdong Province)	2017.09-2019.08	2	NA	6703	54.20	1741/1564	49.3	48.1-50.5
Yang [123]	2021	Cross-sectional	Jiangmen (Guangdong Province)	2018.01-2019.12	2	28-88	100	52.00	17/7	24.0	16.0-33.6
Xie *et al* [124]	2014	Cross-sectional	Zhuhai (Guangdong Province)	2013.01-2013.09	2	21-70	2963	63.75	1156/473	55.0	53.2-56.8
Xie *et al* [125]	2021	Cross-sectional	Chaoshan (Guangdong Province)	2018.03-2020.06	1	16-88	3160	51.27	892/726	51.2	49.4-53.0
Tang and Zhang [126]	2021	Cross-sectional	Shenzhen (Guangdong Province)	2018.06-2020.11	2	NA	3605	53.09	1154/996	59.6	58.0-61.2
Guan *et al*[127]	2022	Cross-sectional	Guangzhou (Guangdong Province)	2020.1-2020.12	1	22-88	6436	54.93	1110/855	30.5	29.4-31.7
Dai *et al* [128]	2020	Cross-sectional	Foshan (Guangdong Province)	2018.1-2018.12	1	28-78	15730	52.45	3855/3157	44.6	43.8-45.4
Li *et al*	2022	Cross-	Shenzhen	2020.09-	1	≥ 20	5007	59.18	1052/700	35.0	33.7-

[129]		sectional	(Guangdong Province)	2021.09							36.3
Xu and Yan [130]	2018	Cohort study	Nanning (Guangxi Zhuang Autonomous Region)	2014.03-2017.06	1	20-65	2956	58.93	787/552	45.3	43.5-47.1
Weng [131]	2017	Cross-sectional	Laibin (Guangxi Zhuang Autonomous Region)	2014.01-2012.03	1	10-89	6328	59.07	2308/1054	53.1	51.9-54.4
Lin and Cheng [132]	2016	Cross-sectional	Hechi (Guangxi Zhuang Autonomous Region)	2016.01-2016.03	1	20-75	1500	54.47	486/226	47.5	44.9-50.0
Wang [133]	2021	Cross-sectional	Nanning (Guangxi Zhuang Autonomous Region)	2017.01-2019.12	1	21-75	1175	67.83	268/114	32.5	29.8-35.3
Chen *et al*[134]	2017	Cross-sectional	Hezhou (Guangxi Zhuang Autonomous Region)	2015.05-2015.12	1	18-80	600	58.67	162/130	48.7	44.6-52.7
Chen [135]	2022	Cross-sectional	Nanning (Guangxi Zhuang Autonomous Region)	2021.01-2021.12.31	2	19-89	1485	75.82	251/99	23.6	21.4-25.8
Cao *et al*[136]	2017	Cross-sectional	Baise (Guangxi Zhuang Autonomous Region)	2012.1-2015.12	2	≥ 7	3363	52.75	930/659	47.2	45.6-49.0
Zhang *et al* [137]	2023	Cross-sectional	Qionghai (Hainan Province)	NA	1	14-85	535	36.64	77/152	42.8	38.6-47.1
Qiu and Xu[138]	2017	Cross-sectional	Chengmai County (Hainan Province)	2015.01-2016.12	2	22-85	1977	68.03	483/225	35.8	33.7-38.0
Ma *et al* [139]	2015	Cross-sectional	Haikou (Hainan Province)	2013.07-2013.10	Interdental tartar	21-81	4122	51.55	550/507	25.6	24.3-27.0
Zeng *et al*[140]	2023	Cross-sectional	Wuzhishan (Hainan Province)	2023.03	1	≥ 18	528	26.70	61/162	42.2	38.0-46.6
Liu *et al* [141]	2023	Cross-sectional	Hainan Province	2021.07-2022.04	1	NA	1355	44.72	269/360	46.4	43.7-49.1
Central China											
Zhao *et al*[142]	2022	Cross-sectional	Zhengzhou (Henan Province)	2020.01-2020.12	1	18-80	8312	61.81	2009/1217	38.8	37.8-39.9
Chai *et al*[143]	2021	Cross-sectional	Zhengzhou (Henan Province)	2018-2019	1	18-87	2589	55.66	391/303	26.8	25.1-28.6
Wang *et al*[144]	2018	Cross-sectional	Henan Province	2017.01-2017.06	1	18-67	2974	56.93	599/418	34.2	32.5-35.9
Liu *et al* [145]	2021	Cross-sectional	Nanyang (Henan Province)	2019.05-2021.02	2	18-78	856	59.00	324/206	61.9	58.6-65.2
Gu *et al* [146]	2014	Cross-sectional	Luohe (Henan Province)	NA	2	13-77	1874	49.73	559/524	57.8	55.5-60.0
Fan *et al* [147]	2015	Cross-sectional	Pingdingshan (Henan Province)	2012.04-2012.06	2	20-83	449	61.02	153/65	48.6	43.8-53.3
Yu *et al* [148]	2022	Cross-sectional	Zhengzhou (Henan Province)	2020.09-2021.4	2	45.36 ± 19.38	772	42.75	173/246	54.3	50.7-57.8
Lei *et al* [149]	2023	Cross-sectional	Zhengzhou (Henan Province)	2020.09-2021.03	2	3-90	731	54.31	164/233	54.3	50.6-58.0
Zhang *et al* [150]	2019	Cross-sectional	Wuhan (Hubei Province)	2017.05-2017.10	1	20-60	11365	72.59	3449/1242	41.3	40.4-42.2

Yang [151]	2020	Cross-sectional	Jingmen (Hubei Province)	2018.01-2018.12	1	15-81	984	57.62	243/125	37.4	34.4-40.5
Li[152]	2022	Cross-sectional	Xianyang (Hubei Province)	2016.10-2017.07	1	15-87	1756	56.09	598/445	59.4	57.1-61.7
Xi[153]	2014	Cross-sectional	Wuhan (Hubei Province)	2012.03-2013.02	1	16-80	3012	48.51	684/733	46.7	45.0-48.5
Liu *et al* [154]	2017	Cross-sectional	Wuhan (Hubei Province)	2015.07-2015.08	1	20-91	2366	55.83	376/315	29.2	27.4-31.1
Zhou and Lin [155]	2018	Cross-sectional	Huangshi (Hubei Province)	2013.10-2016.6	1	3-13	1240	51.94	596/284	46.0	43.2-48.9
Li *et al* [156]	2014	Cross-sectional	Xiaogan (Hubei Province)	2012.6-2013.2	2	12-81	2005	55.16	899/486	50.7	48.5-52.9
Jia *et al* [157]	2016	Cross-sectional	Wuhan (Hubei Province)	2015.03-2015.08	1	51.2	2180	52.02	549/446	47.0	44.9-49.1
Deng *et al*[158]	2020	Cohort study	Wuhan (Hubei Province)	2018.1-2019.12	1	20-70	2619	63.54	778/331	42.3	40.4-44.3
Li *et al* [159]	2015	Cross-sectional	Chenzhou (Hunan Province)	2013.08-2014.12	2	> 20	7015	34.23	663/1230	27.0	25.9-28.0
Peng *et al*[160]	2019	Cross-sectional	Chenzhou (Hunan Province)	2016.01-2017.01	2	22-70	3123	63.24	680/382	34.0	32.3-35.7

NA: Not available.

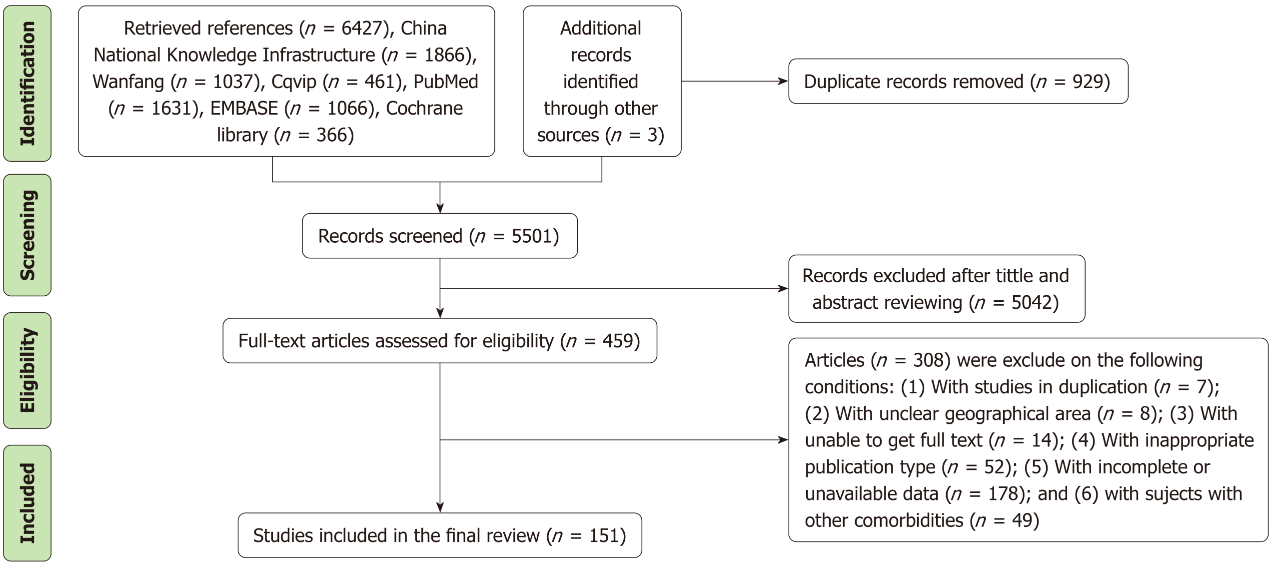

Figure 1 Literature search and screening process.

municipality, autonomous region, geographic region, gender, age, detection method, and publication year (Figure 2).

Among the 30 provinces, municipalities, and autonomous regions, the highest prevalence of *H. pylori* was observed in Qinghai Province at 60.2% (95%CI: 46.5-73.9), and the lowest in Liaoning Province at 24.7% (95%CI: 15.7-33.7). Forest plots detailing the prevalence across these areas are presented in Supplementary Figure 2. A bubble diagram illustrating the incidence of *H. pylori* across these administrative divisions and geographic areas is provided in Figure 3. Of the seven geographical regions, the Northwest exhibited the highest prevalence at 51.3% (95%CI: 45.6-56.9), while the Northeast had the lowest at 29.6% (95%CI: 21.0-38.2). These forest plots are available in Supplementary Figure 3.

Regarding gender differences, the prevalence of *H. pylori* was slightly higher in males at 44.1% (95%CI: 41.9-46.4) than in females at 41.6% (95%CI: 39.3-44.0); these findings are depicted in Supplementary Figure 4. The meta-analysis revealed that the prevalence of *H. pylori* was 27.0% (95%CI: 19.9-34.0) in minors and 42.6% (95%CI: 39.9-45.2) in adults. Among the elderly (≥ 60 years), a higher prevalence of 44.5% (95%CI: 41.9-47.1) was noted (Supplementary Figures 5 and 6).

Concerning detection methods, 97 studies used the UBT and 2 studies employed the Rapid Urease Test (RUT). The infection rates were 43.7% (95%CI: 41.4-46.0) using the UBT, 42.5% (95%CI: 37.9-47.2) with the serum antibody test, 43.5% (95%CI: 12.9-74.2) using the RUT, and 24.1% (95%CI: 11.7-36.6) with the *H. pylori* stool antigen method. The highest

Subgroup	Proportion (95%CI)	*n*
Age (year)		
< 18	0.270 [0.199-0.340]	18
≥ 18	0.426 [0.399-0.452]	90
≤ 60	0.445 [0.419-0.471]	108
Gender		
Male	0.441 [0.419-0.464]	148
Female	0.416 [0.393-0.440]	148
Publication year		
2014-2018	0.422 [0.392-0.453]	77
2019-2024	0.433 [0.404-0.462]	75
Geographical region		
Central China	0.440 [0.392-0.489]	19
East China	0.442 [0.412-0.471]	43
North China	0.394 [0.300-0.487]	15
North East	0.296 [0.210-0.382]	6
Northwest China	0.513 [0.456-0.569]	23
South China	0.427 [0.383-0.470]	22
Southwest Region	0.366 [0.310-0.423]	24
Detection method		
UBT	0.437 [0.414-0.460]	97
Serology	0.425 [0.379-0.472]	41
RUT	0.435 [0.129-0.742]	2
Stool antigen	0.241 [0.117-0.366]	6
Pooled proportion		
Total	0.428 [0.407-0.449]	152

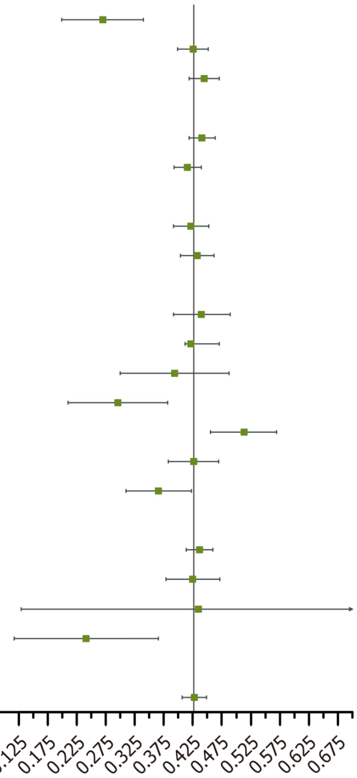

Figure 2 Subgroup analysis of *Helicobacter pylori* prevalence. *N*: Number of included studies; UBT: Urea breath test; RUT: Rapid urease test.

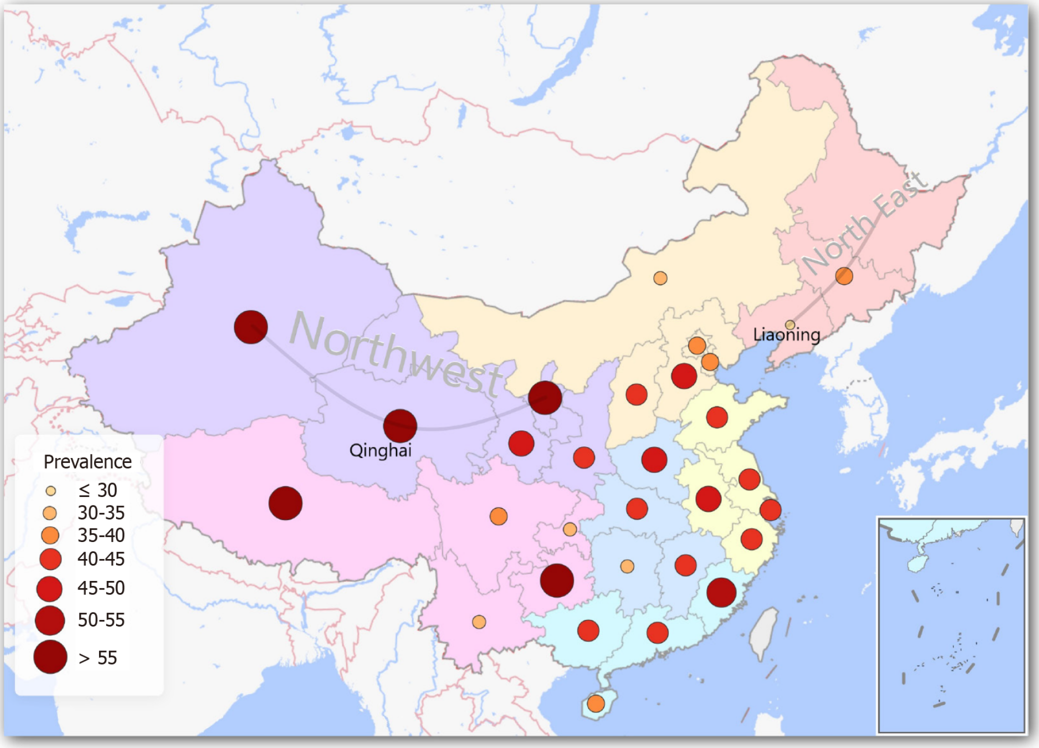

Figure 3 Bubble diagram of *Helicobacter pylori* prevalence.

infection rate was detected by the UBT method, while the lowest was by the *H. pylori* stool antigen method. Forest plots for these testing modalities are included in Supplementary Figure 7. From the literature spanning 2014-2018, the prevalence of *H. pylori* infection was 42.2% (95%CI: 39.2-45.3), and from 2019-2024, it was 43.3% (95%CI: 40.4-46.2). The slight increase in prevalence over these periods was not statistically significant (Supplementary Figures 8 and 9).

Sensitivity analysis

Sensitivity analysis of the combined results was performed using the "leave-one-out" method. The robustness of the study results was confirmed as there were no significant changes; this analysis is shown in Supplementary Figure 10.

Publication bias assessment

Publication bias was evaluated using a funnel plot and the AS-Thompson test, with arcsine transformation used in cases of significant heterogeneity. The analysis yielded a symmetrical funnel plot (t = 1.42, P = 0.157), indicating minimal publication bias. These results are visually displayed in Supplementary Figure 11 and 12.

DISCUSSION

H. pylori, a gram-negative microaerobic bacterium, forms colonies on the epithelial surfaces of the human gastric mucosa, leading to chronic infections[162]. This bacterium has a global prevalence, affecting approximately fifty percent of the world's population, thereby constituting a significant health issue. While a significant majority of infected individuals exhibit no symptoms, the infection carries considerable health implications, as 1%-3% of those affected may progress to GC, and 0.1% may develop mucosa-associated lymphoid tissue lymphoma[163]. The optimal initial therapeutic approach involves a combination of proton pump inhibitors (PPI), amoxicillin, and clarithromycin, commonly referred to as PPI, amoxicillin, and clarithromycin. In regions with elevated primary clarithromycin resistance, bismuth-based quadruple therapies are becoming a favored alternative[164]. Additionally, traditional Chinese medicine[165,166] and microecological agents[167,168] have become crucial in boosting eradication rates and combating drug resistance to *H. pylori*.

Given the demographic and regional disparities in China, understanding the prevalence of *H. pylori* is vital for informing future research and healthcare strategies.

This study revealed that the infection rate of *H. pylori* in China from 2014 to 2023 was 42.8% (95%CI: 40.7-44.9), a decrease from the rates reported in earlier periods by Ren *et al*[3] from 1990 to 2019 (44.2%, 95%CI: 43.0-45.5) and Li *et al* [169] from 1983 to 2020 (49.6%, 95%CI: 46.9-52.4). Research by Li *et al*[170] suggests that the global estimated prevalence of *H. pylori* decreased from 58.2% (95%CI: 50.7-65.8) between 1980 and 1990 to 43.1% (95%CI: 40.3-45.9) between 2011 and 2022. With the continuous improvement of living environment and hygiene level, and the increasing coverage of basic medical security, the prevalence of *H. pylori* in China has also shown a downward trend, similar to the global trend of *H. pylori* prevalence.

The ingestion of raw water and the consumption of vegetables and fruits that have been washed from contaminated water sources represent risk factors for *H. pylori* infection[171,172]. Nevertheless, the dissemination of *H. pylori* infections has been constrained alongside enhancements in living standards and hygiene, including augmented access to clean water and more effective sewage treatment[173]. Public awareness of *H. pylori* and its modes of transmission also resulted in reducing infection rates[174,175]. Studies[176,177] have shown that the public's knowledge about *H. pylori* and how it is spread has increased in the last decade. The detection of *H. pylori* infection has been included in the health examination items. The rapid, simple and reliable detection method has been preliminarily accessible. The awareness of active medical treatment among infected people was significantly enhanced[7]. The above reasons have all contributed to the decline of *H. pylori* infection rate in China in the past decade.

However, the diseases associated with them remain among the great challenges to public health. This report presents updated comprehensive trends in clinically significant and relevant *H. pylori* infection based on a critical analysis of 152 studies that have been published over the past decade. The results of this study is of a certain credibility and timeliness, and has a certain clinical reference value.

The highest prevalence rate of *H. pylori* infection was found in Northwest China, which showed a percentage of 51.3% (95%CI: 45.6-56.9). In the northwest region, it is highly prevalent in Qinghai Province, showing a prevalence of 60.2% (95%CI: 46.5-73.9). On the contrary, the lowest infection rates were observed in Northeast China, where the prevalence was 29.6% (95%CI: 21.0-38.2), and the minimum rate was in Liaoning Province at 24.7% (95%CI: 15.7-33.7).

H. pylori has co-evolved with the human host ever since its origin. Local transmission and genetic isolation have facilitated the development of different bacterial populations that are characteristic for geographical areas[178]. You *et al* [179] conducted a comparative genomic analysis of the genomic sequence features of Chinese *H. pylori*, and the results of Neighbor Joining analyses of 10 Chinese *H. pylori* strains showed geographic clustering of *H. pylori* strains in China. Geographical factors play a long-term and fundamental role in regional development. The expansive northwest region of China, distinguished by its extensive deserts and delicate ecosystems, also sustains robust animal husbandry and a considerable population of nomadic herders. Inhabitants predominantly consume a meat-rich diet[180], with vegetable intake falling below the levels suggested by the Chinese Balanced Dietary Pagoda[181]. The economic development in Northwest China is relatively underdeveloped, and compared with other regions, the allocation of health resources is insufficient[182]. Oral-oral and fecal-oral pathways stand as the primary mechanisms for the transmission of *H. pylori*, which tends to cluster within families[183]. The region of Northeast China is characterised by fertile land, abundant water and food resources, rich mineral resources and a relatively early economic start. The long winter season and low population density serve to restrict the dissemination of *H. pylori* infection. Although infection rates in the Northeast are comparably low, the prevalent antibiotic resistance remains a substantial issue[184]. Two provinces in the Southwest region, Qinghai-Tibet (58.1%; 95%CI: 53.6-62.6) and Guizhou Province (56.6%; 95%CI: 53.1-60.1), have particularly high infection rates.

Zhang *et al*[185] has shown that the high rates of *H. pylori* infection and GC among Tibetan residents of the plateau are not only related to the backward level of health and economy, but also to the environmental characteristics of the plateau. The frigid, oxygen-deprived conditions of the plateau can result in gastric mucosal injury and disruption to the intestinal barrier, thereby enhancing susceptibility[186]. The Guizhou Province region has a humid climate and the locals enjoy spicy diets and pickled foods. Both were found to be independent risk factors for *H. pylori* infection[187,188].

Consequently, elements such as environmental conditions, economic status, and sanitation practices collectively impact the prevalence of *H. pylori* to varying extents.

Addressing the pronounced prevalence of *H. pylori* infection in Northwest China, particularly given the high incidence and mortality rates of GC in Qinghai Province and Guizhou Province[6], we should launched health education initiatives in these high-incidence and high-risk areas to improve the population's awareness of the risks associated with *H. pylori*, alongside the available treatment options and their benefits.

So as to fostering changes in knowledge, attitudes, and behaviors, and enable general population actively participate in the work of prevention, screening and treatment of *H. pylori*. This approach additionally facilitates the primary prevention of GC[177,189]. In regions characterized by heightened antibiotic resistance, the use of antibiotics should be meticulously regulated. Where conditions permit, treatment programmes can be tailored to the antibiotic susceptibility results of individual patients. Compared to these high prevalence areas, infections in other areas are not as serious. However, the prevention and treatment of the disease should not be neglected. In these areas, the compliance of infected people with prescribed treatment and re examination should be improved in order to improve the eradication rate[190]. At the same time, family based management and treatment strategies should be implemented to avoid reinfection. Promote a healthy diet and reduce the intake of ultra-processed food; develop good living habits and actively prevent the occurrence of *H. pylori* infection[191].

In this study, the prevalence of infection was notably higher in adults compared to minors, with significant prominence in the elderly (> 60 years) (Supplementary Figure 5 and 6). The elderly are more susceptible due to distinctive gastric features, including delayed gastric emptying[192], diminished glandular function[193,194], and a less diverse microbial environment in the stomach[195,196]. People worldwide are living longer. The worldwide demographic is experiencing a significant increase in age, with forecasts from the World Health Organization suggesting that the population aged 60 years and above will double to 2.1 billion by the year 2050[197]. *H. pylori* is associated with gastrointestinal disturbances as well as the development of various systemic diseases. Studies suggest that *H. pylori* infection could increase the likelihood of developing neurodegenerative disorders, including Alzheimer's disease[198,199] and Parkinson's syndrome [200], in addition to cardiovascular diseases[201]. In treating the elderly, medical professionals must consider factors like antibiotic resistance, potential drug interactions, and adherence to medication, while carefully balancing the risks and benefits of eradication therapy[202,203].

The incidence of *H. pylori* infection in pediatric populations shows considerable variation internationally, with reported rates ranging from 3.2% to 84%, influenced by factors including geographical location, environmental conditions, diagnostic techniques, host specificity, and the timing of the study[204]. Factors such as early exposure to pre-chewed food, familial history of gastric disorders, the sharing of personal hygiene items like towels and mouthwash cups[205, 206], and low socioeconomic status[207] are significant contributors to the risk of *H. pylori* infection in children. Recent updated guidelines do not recommend the "test-and-treat" approach for asymptomatic *H. pylori* infections in pediatric populations, referencing a lack of substantial evidence supporting its effectiveness in reducing the risk of future GC[208].

Regarding detection methods, the highest infection rate identified by the UBT was 43.7% (95%CI: 41.4-46.0), surpassing those detected by serological tests, stool antigen tests, and RUT. Ma *et al*[139] reported an *H. pylori* positivity rate of 26.85% utilizing an immunocolloidal gold assay for interdental tartar in subjects. The UBT, preferred for its non-invasive, painless, and repeatable nature, includes two variations: 13C-UBT and 14C-UBT, with the former being more sensitive, non-radioactive, and therefore safer[209]. Recent global guidelines endorse the UBT as the preferred diagnostic tool for *H. pylori*, recommending it for both initial diagnosis and post-eradication evaluation[210-212], with an emphasis on maintaining stringent quality controls to improve the test's precision. The monoclonal-based stool antigen test also remains a reliable, recommended method with comparable accuracy to the UBT, particularly beneficial for children under six who are less suited for UBT[213]. Serum *H. pylori* antibody tests are predominantly used in clinical epidemiological studies to ascertain both past and current infections[164,214], and their diagnostic accuracy is enhanced when used in conjunction with UBT[215]. However, the value of serological screening is limited in areas with low infection rates[216]. The identification of *H. pylori* subtypes aids in assessing infection status and virulence, and can forecast the development of GC[217]. Although RUTs are highly sensitive, their specificity is compromised by factors like sample size and the focal distribution of *H. pylori* in the stomach[218]. Selecting a diagnostic approach requires consideration of regional infection rates, clinical scenarios, patient age, among other factors, to ensure the selection of suitable and reliable tests for effective treatment planning.

This study's strengths are evident in: (1) Utilizing recent literature spanning the last ten years to mirror the current situation of *H. pylori* infection; (2) Conducting an exhaustive examination of *H. pylori*'s current prevalence in China, pinpointing key demographics and areas where infection rates are heightened; (3) Incorporating a significant corpus of studies with ample sample sizes, excluding any with fewer than 50 subjects to reduce potential small-sample biases; and (4) Rigorous adherence to established protocols for selecting literature and extracting data, supplemented by cross-validation to enhance the reliability of findings.

The limitations of this study include the following: (1) Some provinces and diagnostic modalities in this study had a low number of included studies, which may have had some impact on the results; and (2) Although we performed subgroup analyses for the results of the study in terms of geographic region, testing modality, age, gender, and so on, there was still a large degree of heterogeneity in the study.

CONCLUSION

In summary, the prevalence of *H. pylori* infection in China from 2014-2023 is 42.8% (95%CI: 40.7-44.9), marking a decrease from the preceding decade. The rates of *H. pylori* infection vary depending on geographic location, detection methods, and population demographics. Given the substantial disease burden associated with *H. pylori* infections, further studies into the mechanisms behind the disparities in *H. pylori* prevalence, both in China and globally, is both significant and urgent.

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FOOTNOTES

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