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REVIEW ARTICLE

Bibliometric analysis of the correlation between H. pylori and inflammatory bowel disease

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Abstract

Background: Helicobacter pylori (H. pylori) infection is prevalent and associated with the development of various gastric diseases. On the other hand, inflammatory bowel disease (IBD) is an immune-related intestinal disorder influenced by factors like gut microbiota imbalance, genetic predisposition, and environmental influences. Despite extensive research on the H. pylori–IBD relationship, a comprehensive bibliometric analysis in this area is lacking. Therefore, this study aims to use bibliometric methods to explore research trends, hotspots, and frontiers in H. pylori and IBD-related research, offering valuable insights for future research and clinical practice.
Methods: We retrieved relevant literature on H. pylori and IBD from the Web of Science Core Collection (WoSCC) and Scopus databases covering 2007 to 2024. We perform a comprehensive analysis within the WoSCC literature. We compare these findings with relevant results from Scopus.
Results: Research on H. pylori and IBD has remained prominent in recent years. The United States leads in output, with strong contributions from authors, institutions, and journals. China, despite being a developing country, shows rapid article growth, signaling growing research potential. Key topics include Crohn's disease, gut microbiota, H. pylori infection, and ulcerative colitis. Newer interests include health, cancer prevention, and chronic gastritis.
Conclusion: Over the past, research on H. pylori and IBD has primarily centered around epidemiology and clinical studies. The question of whether H. pylori definitively offers protective effects against IBD remains unresolved. Therefore, further investigation could explore the underlying mechanisms of their relationship or initiate long-term prospective cohort studies to gather more compelling evidence.

Introduction

Helicobacter pylori (H. pylori) is a widespread pathogen found globally and is one of the most common pathogens in our daily lives.[1] Especially in developing countries, the prevalence rate of H. pylori is between 60% and 90%.[2] Studies have shown a close association between H. pylori infection and various gastric conditions, including superficial gastritis, gastric ulcers, atrophic gastritis, and gastric cancer.[3] Meanwhile, an increasing amount of evidence indicates that H. pylori is associated with an elevated

incidence of distal gastric cancer.[4] Therefore, the existing consensus on the management of H. pylori infection is more positive, and most patients were recommended radical treatment.[5] However, several meta-analyses utilizing existing epidemiological data to investigate the relationship between H. pylori and inflammatory bowel disease (IBD) have indicated a significant negative correlation between H. pylori and IBD. This suggests that H. pylori infection may have beneficial effects on IBD.[6,7] In addition, there are some epidemiological studies and animal experiments that indicate a negative correlation between H. pylori and IBD.[8,9]

IBD is a group of gastrointestinal tract chronic inflammatory diseases, including Crohn's disease (CD) and ulcerative colitis (UC).[10] The etiology of IBD is thought to be related to environmental factors, infectious microorganisms, ethnic origin, genetic predisposition, and a dysfunctional immune system.[11] Therefore, more and more scholars have researched the relationship between IBD and H. pylori.[12] The relationship between H. pylori and IBD has not been systematically evaluated through a bibliometric analysis. The discipline of bibliometrics is the application of mathematical and statistical methods to scholarly publications,[13] and it can help researchers understand which authors, journals, or institutions in the field have a higher influence through statistical analysis and visualization graphs, which is a valuable approach to evaluate scientific production.[14] Additionally, a bibliometric analysis also helps to reveal the collaboration patterns and networks among researchers and the composition and knowledge structure of the literature in different fields.[15] In this study, we perform a comprehensive analysis on countries, author collaboration networks, journals, institutions, and keyword co-occurrence within the Web of Science Core Collection (WoSCC) literature, and compare these findings with relevant results from Scopus. The purpose of this article is to reveal the research hotspot and current situation of the relationship between H. pylori and IBD and to provide new ideas for the prevention and treatment of H. pylori infection and IBD.

Methodology

Data. The literature used for quantitative analysis was extracted from WoSCC and Scopus. WoSCC is widely recognized as one of the most authoritative databases, extensively utilized for literature retrieval and research evaluation purposes.[16] Scopus, on the other hand, is one of the largest citation databases, encompassing scientific journals, conference proceedings, and books.[17] To mitigate potential biases from database updates, all relevant data regarding H. pylori and IBD were collected on June 25, 2024. The search utilized the following strategy: "Inflammatory bowel disease" OR "Inflammatory Bowel Diseases" OR "Crohn Disease" OR "Crohn's Disease" OR "Ulcerative Colitis" AND "H. pylori" OR "Helicobacter pylori" OR "Helicobacter nemestrinae". The TS field in the WoSCC database and the TITLE-ABS-KEY field in the Scopus database were selected for the search, and the retrieval time spanned from January 1, 2007, to June 25, 2024. The document screening process is detailed in Figure 1; two collaborators independently reviewed the titles and abstracts of each result, excluding irrelevant entries such as review articles, ecological studies, and meta-analyses. Discrepancies in literature interpretation were resolved through negotiation to achieve consensus. In total, 605 articles from WoSCC and 591 articles from Scopus were collected and downloaded for analysis concerning the association between H. pylori and IBD.

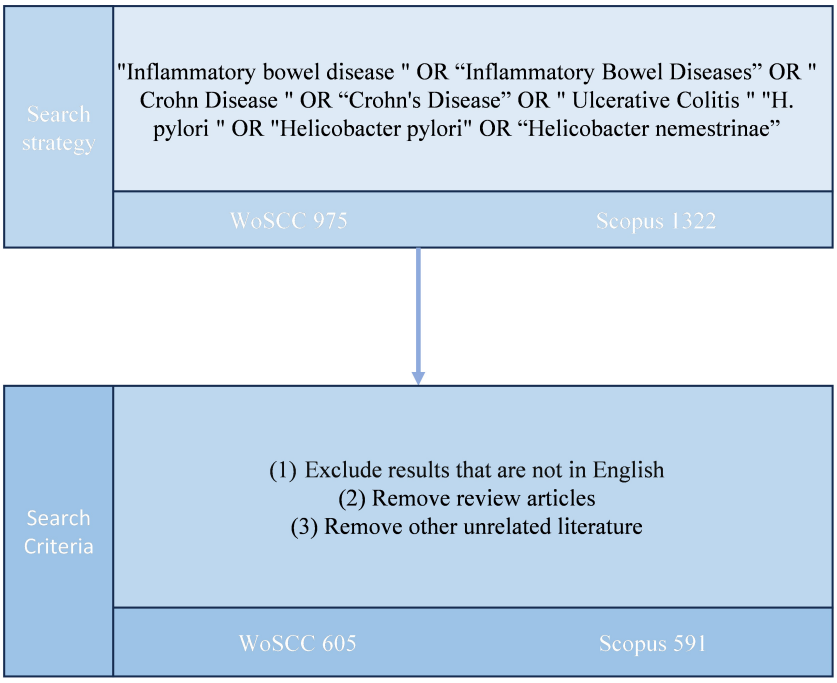

Figure 1 Process diagram for literature collection and screening.

Tool. Data analysis mainly uses two software programs, CiteSpace (6.2.R6)[18] and VOSviewer (1.6.11),[19] for author, country, and institution co-occurrence analysis, citation collaboration analysis, cluster analysis, keyword co-occurrence analysis, etc. Microsoft Excel, PowerPoint, Scimago Graphica,[20] and Photoshop are mainly used for drawing and table organization.

Results

The trend of publications on the research of H. Pylori and IBD. First, the analysis was conducted on the 605 articles retrieved from WoSCC. Research on H. pylori and IBD predominantly focuses on gastroenterology and hepatology, aligning with the search criteria. Other prominent areas include microbiology, immunology, and pharmacology (Fig 2b). Second, the analysis of publication trends reveals a steady increase in the total number of publications related to H. pylori and IBD over the past decade. Although there was a slight dip in 2017, the trend resumed an upward trajectory in subsequent years. While 2023 showed a decrease in publications, citations remained consistent, suggesting sustained interest in the field. It is important to note that the decrease in 2024 publications may be due to the timing of data collection in mid-2024, where many articles may still be under review, thus not fully reflecting the year's output (Fig 2a). Additionally, the trend in article retrieval from the Scopus database mirrors that of WoSCC, underscoring the reliability of the analysis.

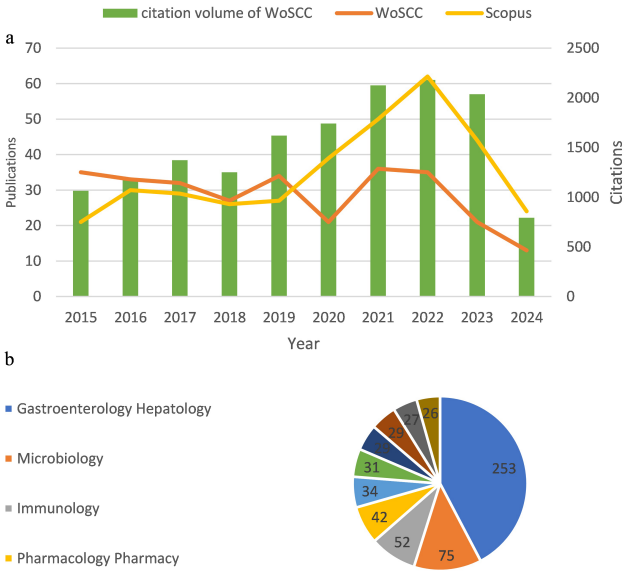

Figure 2 Analysis of the literature output. (a) The annual publication volume of WoSCC and Scopus databases, as well as the annual citation volume of WoSCC databases; (b) Subject categories of the literature in the WoSCC database.

Author's output, cooperation, and citation analysis. According to Price's law, in studies on H. pylori and IBD, the number of publications by core authors should exceed four. The software has a total of 3304 authors, with 45 of them being core authors, accounting for only 1.36% of the total. From Table 1, it is evident that *Robert M Genta* ranks highest among the top 10 authors, with 20 articles published, 476 citations, and a link strength of 21. *James G Fox* ranks sixth in publication volume, with the most citations at 701 and a link strength of 8. Additionally, *Arisawa Tomiyasu*, *Tomoyuki Shibata*, and *Tomomitsu Tahara* each published 8 articles, with a maximum link strength of 128 citations. Analysis from the Scopus database highlights these results. Collaborative network analysis reveals distinct group dynamics and member identities within the research community, offering insights for future collaborations. *Keith T. Wilson, Kshipra Singh*, and *Lori A. Coburn* have established robust collaborative relationships, forming a large network. Two smaller, independent cooperative networks have emerged: one led by *Tomomitsu Tahara* and another involving *John Y. Kao* and associates (Fig 3a). These networks show limited interconnection. Despite their high citation counts, *Amnon Sonnenberg* and *James G Fox* were not clustered together in the analysis. Additionally, in the Scopus database analysis, clustering results for influential authors remain consistent. The conclusion that multiple collaborative networks exist among these authors with minimal overlap also holds true (Fig 3b).

Country's output and co-occurrence analysis. Using VOSviewer for analysis, we identified the top 10 countries based on publication volume. The United States emerges as the most influential country, leading in both publishing and citation levels (Table 2). China closely follows in second place, with

Table 1 Top10 authors in WoSCC

Rank	Author	Documents	Citations	Country	Total link strength
1	Robert M Genta	20	476	USA	21
2	A Sonnenberg	20	411	USA	20
3	Keith T Wilson	10	431	USA	62
4	John Y Kao	10	219	USA	19
5	Lori A Coburn	9	385	USA	58
6	James G Fox	9	701	USA	8
7	Tomiyasu Arisawa	8	128	Japan	63
8	Tomoyuki Shibata	8	128	Japan	63
9	Tomomitsu Tahara	8	128	Japan	63
10	Kshipra Singh	8	345	USA	53

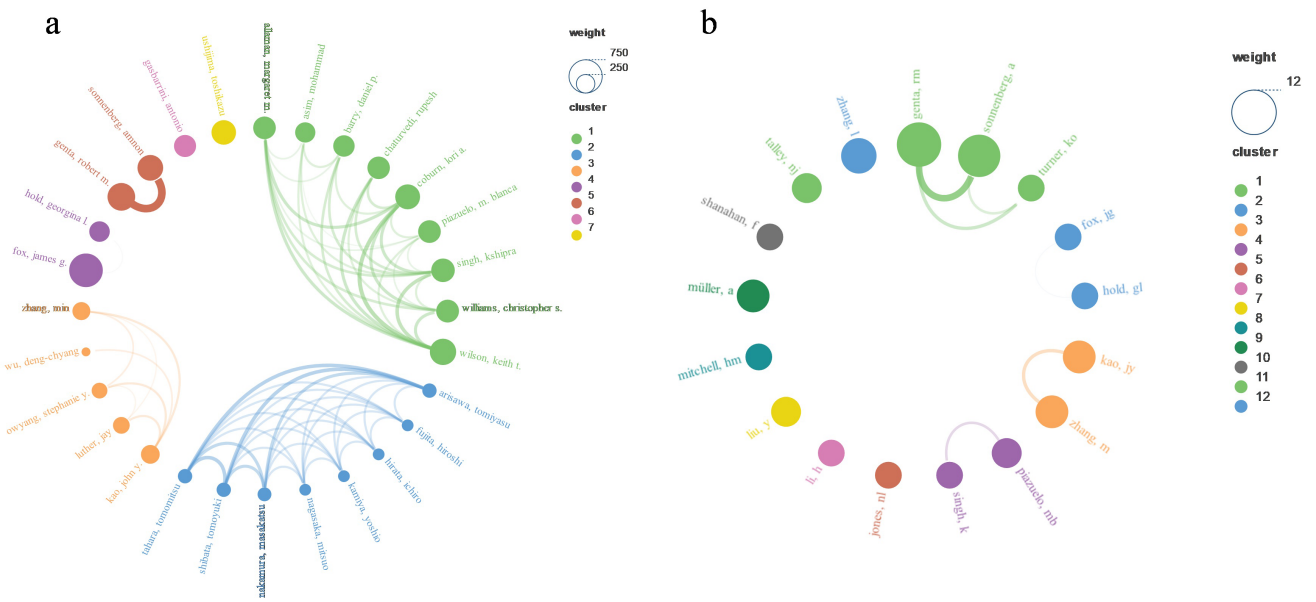

Figure 3 (a) The author collaboration network diagram in the WoSCC database, where node size represents the number of times the author has been cited. The connection between authors represents cooperation between the two, and the darker the color of the link and the wider the width, the stronger the link strength. (b) The author collaboration network diagram in the Scopus database.

Table 2 Top10 countries in WoSCC

Rank	Country	Documents	Citations	Total link strength
1	USA	163	7012	76
2	China	87	2178	24
3	Japan	71	2128	28
4	Italy	39	1328	43
5	United Kingdom	38	1560	64
6	Germany	35	1287	49
7	Australia	33	1701	28
8	Switzerland	29	1175	45
9	Canada	24	1261	17
10	France	21	1111	53

Japan, the United Kingdom, Italy, Germany, Australia, Switzerland, Canada, and France following in rank. Notably, China is the only developing country among these top 10 nations. Compared with other countries, the United States exhibits significantly higher publication volumes and engages closely in cooperation with many nations (Fig 4a,c), particularly China. This underscores China's substantial potential in future research collaborations. In the Scopus database analysis, the cooperation patterns among these influential countries are largely consistent (Fig 4b,d), and the publication volume maps derived from both databases are nearly identical. This consistency validates the reliability of our research findings.

Organizations' output analysis. According to the analysis of VOSviewer in WoSCC, the organizations with the highest number of articles are the *Department of Veterans Affairs*, *Veterans Health Administration*, *Veterans Health Administration*, *Oregon Health Science University*, *Vanderbilt University*, *Portland VA Medical Center*, *University of Texas System*, *University of Texas Southwestern Medical Center at Dallas*, *Baylor College of Medicine*, *Miraca Life Sciences*, and *Veterans Affairs (VA) Tennessee Valley Healthcare System* (Table 3). Most of the institutions within actually belong to the *Veterans Health Administration*, the largest comprehensive healthcare network in the United States, dedicated to providing comprehensive medical services for eligible military personnel, veterans, and their families. The analysis of results from the Scopus database may slightly differ from WoSCC, yet it highlights the *US Veterans Health Administration* as the predominant organization with significant publications and influence. Additionally, the *University of Texas* shows strong performance across both databases. These institutions, all based in the United States, underscore its dominant influence in this field.

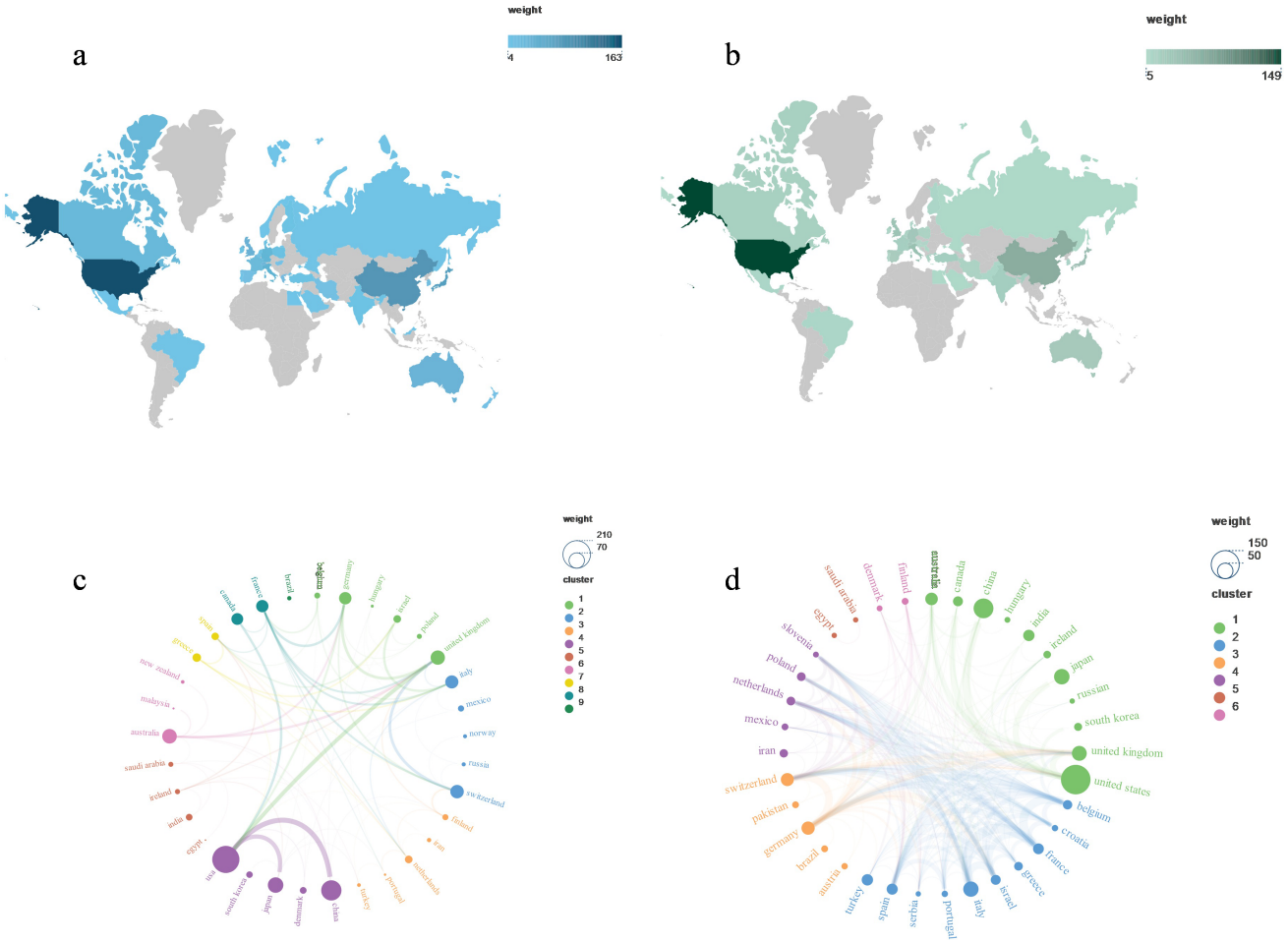

Figure 4 (a) National publication volume map in WoSCC. (b) National publication volume map in Scopus. (c) National Cooperation Network Diagram in WoSCC. The node size represents the number of national publications. The connection between countries represents cooperation between the two, and the darker the color and wider the width of the link, the stronger the strength of the link. (d) National Cooperation Network Diagram in Scopus.

Table 3 Top 10 Organizations in WoSCC and Scopus

	WoSCC		Scopus	
Rank	Organization	Documents	Organization	Documents
1	Department of Veterans Affairs, Veterans Health Administration	34	Baylor College of Medicine	12
2	Veterans Health Administration	34	Mayo Clinic	10
3	Oregon Health Science University	20	Tel Aviv University	10
4	Vanderbilt University	17	Portland VA Medical Center	10
5	Portland VA Medical Center	16	Karolinska Institute	10
6	University of Texas System	15	Oregon Health & Science University	10
7	University of Texas Southwestern Medical Center at Dallas	13	VA Medical Center	9
8	Baylor College of Medicine	12	Karolinska Univeritetssjukhset	9
9	Miraca Life Sciences	12	University of Texas System	7
10	Veterans Affairs (VA) Tennessee Valley Healthcare System	12	UNSW Sydney	7

Journal's publications analysis. Through VOSviewer analysis, the top 10 journals in terms of publication volume in WoSCC are the *World Journal of Gastroenterology*, *Helicobacter*, *Inflammatory Bowel Diseases*, *Plos One*, *Digestive Diseases and Sciences*, *Gut*, *Gastroenterology*, *Journal of Gastroenterology and Hepatology, Alimentary Pharmacology Therapeutics*, and *Clinical Gastroenterology And Hepatology* (Table 4). The journal is mainly divided into Q1 or Q2. The analysis of journals helps us identify influential publications, guiding our literature searches and article submissions. According to WoSCC data, the *World Journal of Gastroenterology* and *Helicobacter* rank highest in terms of publications. While there are slight discrepancies in publication numbers between the two databases, both databases highlight their prominence. *Gastroenterology* leads the top 10 journals with an impact factor of 25.7, followed by *Gut* at 23. Despite a lower publication count, their articles maintain significant influence. However, Scopus retrieved insufficient articles from *Gastroenterology* and *Gut*, possibly due to differences in citation scope across databases.

Co-cited literature analysis. Citation analysis can reveal the knowledge base and frontier of a field. In a co-citation graph, nodes connected by lines indicate that they are referenced in the same publication, while shorter lines indicate a closer relationship. The results of co-citation analysis reveal the three most cited articles in the field: *Jay Luther*'s 2010 article in *Inflammatory Bowel Diseases*, cited 56 times; *M F Dixon*'s 1996 article in the *American Journal of Surgical Pathology*, cited 49 times; and *Amnon Sonnenberg*'s 2012 article in *Food Pharmacology and Therapeutics*, cited 39 times. Interestingly, *M F Dixon*'s article is not clustered with the other two most co-cited articles, suggesting divergent research directions (Fig 5). To better understand the knowledge foundation in this field, we have compiled a detailed list of the top 10 cited references (Table 5). We found that most of the literature in this list consists of reviews or meta-analyses, which are highly cited due to their comprehensive synthesis of knowledge. *Jay Luther*'s meta-analysis on H. pylori infection and IBD stands out for its strong association with strength and significant co-citation, highlighting its pivotal role in this research area. Furthermore, analyzing the publication years of co-cited literature reveals that research on H. pylori and IBD dates back to the last century, establishing a foundational basis for this field. Additionally, we have identified highly cited authors who focus on topics including H. pylori, UC, CD, probiotics, inflammation, and microbiota.

Keywords Co-occurrence and burst word analysis. Through keyword co-occurrence analysis, we identified significant research trends from a dataset containing 2999 keywords. Among these, 31 keywords appeared 18 times or more. Notably, "Helicobacter pylori" emerged as the most frequent term, showing strong connections with "inflammatory bowel disease" and "colorectal cancer" in a network graph visualization (Fig 6a). Cluster analysis further revealed that H. pylori is clustered with UC, gut microbiota, inflammation, and colorectal cancer, while IBD and CD form another distinct cluster.

Using CiteSpace and the log-likelihood ratio algorithm, we achieved a modularity Q of 0.3992 (>0.3) and an average silhouette S of 0.7459 (>0.7), indicating robust clustering results. Our analysis uncovered 23 clusters, with the largest 8 clusters highlighted as follows: pediatric patient (cluster no. 0), extra gastric disease (cluster no. 1), case–control study (cluster no. 2), active CD (cluster no. 3), cationic amino acid transporter (cluster no. 4), oxidative stress (cluster no. 5), clinic practice (cluster no. 6), and cerebrovascular disease (cluster no. 7). The timeline spans from 2007 to 2024, highlighting the progress in this field across the first 8 clusters (Fig 6b). The largest cluster focuses on pediatric patients (cluster no. 0), once a prominent research area. New research trends have emerged, notably the second cluster, which centers on case–control studies. Key topics within this cluster include H. pylori, IBD, and gut microbiota, which remain current research hotspots. Clinical practice (cluster no. 6), particularly those involving irritable bowel syndrome, also feature prominently. Time zone maps effectively identify recent research keywords, emphasizing health, cancer prevention, chronic gastritis, obesity, and related areas (Fig 6c). These findings are further supported by time zone map results from the Scopus database (Fig 6d).

Discussion

With the progress of science and technology, the diagnostic accuracy of many diseases has been significantly improved, which is both an opportunity and a challenge for us.[21] Related research has revealed that H. pylori and IBD are both prevalent conditions

Table 4 Top 10 Journals in WoSCC and Scopus

	WoSCC		Scopus	
Rank	Journals	Documents	Journals	Documents
1	World Journal of Gastroenterology	29	Helicobacter	13
2	Helicobacter	25	World Journal of Gastroenterology	13
3	Inflammatory Bowel Diseases	18	Frontiers In Immunology	11
4	PLOS One	17	Inflammatory Bowel Diseases	11
5	Digestive Diseases and Sciences	13	Journal of pediatric gastroenterology and nutrition	11
6	Gut	13	Digestive Diseases	10
7	Gastroenterology	11	Digestive Diseases and Sciences	10
8	Journal of Gastroenterology and Hepatology	11	Frontiers In Microbiology	10
9	Alimentary pharmacology & therapeutics	10	PLoS One	9
10	Clinical Gastroenterology And Hepatology	9	Alimentary pharmacology & therapeutics	7

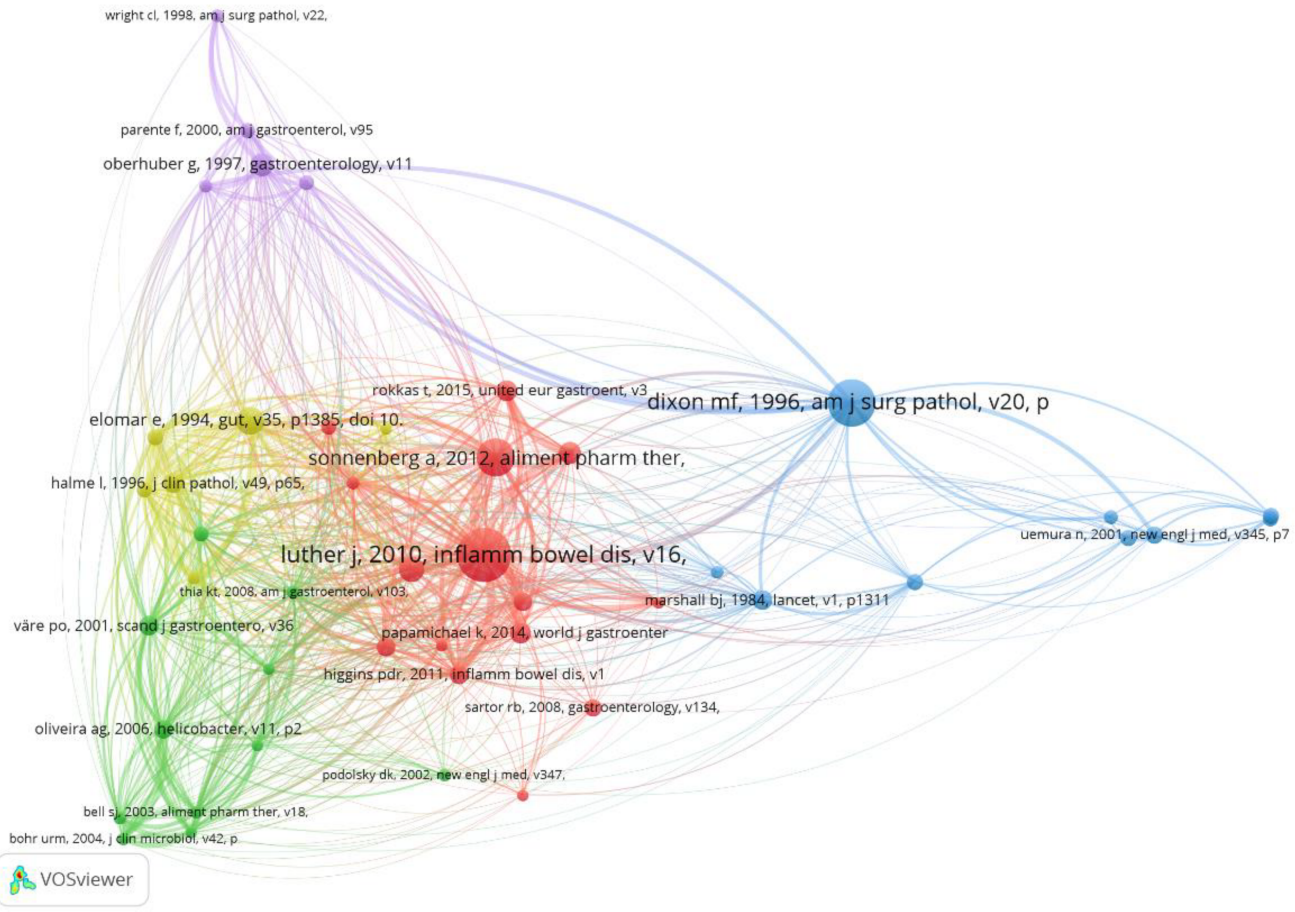

Figure 5 Co-cited literature analysis.

within the field of gastroenterology,[1,22] In the past 15 years, many researchers have conducted many studies on the correlation between H. pylori and IBD.[23,24] To our knowledge, this is the first visual analysis of the literature using metrology, through which scholars can gain a basic understanding of the field identify areas or trends of interest, and encourage them to conduct further research in the field. Even more, we provide the history and current state of research in this field and predict its future research directions. Based on the WoSCC and Scopus database, as evidenced by a qualitative and quantitative analysis conducted using the VOSviewer and CiteSpace, over the past 15 years, there has been a significant increase in the number of scientific discoveries related to H. pylori and IBD.[6,23] And we found that most literature findings suggest a negative correlation between H. pylori and IBD.[25–27]

Most of the productive authors and institutions come from the United States, but there is a lack of in-depth cooperation and exchanges. Our research underscores *Amnon Sonnenberg* and *James G. Fox* as the most influential authors in our field, demonstrating exceptional performance in publications and citations. However, there is a notable lack of significant collaboration between these core authors and other influential figures. Analysis of authors and institutions reveals a dominant presence of the United States within the top 10 rankings. The United States leads both in the number of published papers and citations, solidifying its status as a major research hub for H. pylori and IBD. Therefore, researchers can obtain the most advanced research concepts and technical methods by visiting research institutions in the United States, participating in international academic conferences, or visiting scholar projects. These exchanges and collaborations can help promote research progress on the relationship between H. pylori and IBD on a global scale. China and Japan rank second and third, respectively, in national analysis, showcasing substantial growth and potential in Asia. Nonetheless, deeper collaboration among institutions and authors remains limited, likely influenced by the clinical focus of research, as indicated by keyword analysis. In terms of journal selection, the *World Journal of Gastroenterology* stands out for its high publication and citation rates, making it an attractive venue for scholars. Alternatively, submitting work to more influential journals like *Gut* or *Gastroenterology* could enhance visibility and impact.

The protective effect of H. Pylori on IBD is yet to be determined. To better reveal the protective effect of

Table 5 TOP10 co-cited references

Rank	Article	First author	Journals	Citations	Total link strength	Year
1	Association Between Helicobacter pylori Infection and Inflammatory Bowel Disease: A Meta-analysis and Systematic Review of the Literature	Jay Luther	Inflammatory Bowel Diseases	56	96	2010
2	Classification and grading of gastritis. The updated Sydney System.	M F Dixon	The American Journal of Surgical Pathology	49	45	1996
3	Low prevalence of Helicobacter pylori infection among patients with inflammatory bowel disease	Amnon Sonnenberg	Alimentary Pharmacology and Therapeutics	39	79	2012
4	Low prevalence of Helicobacter pylori in inflammatory bowel disease: association with sulphasalazine	E el-Omar	Gut	29	59	1994
5	Dual role of Helicobacter and Campylobacter species in IBD: a systematic review and meta-analysis	Natalia Castaño-Rodríguez	Gut	27	45	2017
6	Focally enhanced gastritis: a frequent type of gastritis in patients with Crohn's disease	G Oberhuber	Gastroenterology	24	32	1997
7	Helicobacter pylori infection and inflammatory bowel disease in Asians: A meta-analysis	Xiao-Wei Wu	World Journal Of Gastroenterology	23	62	2015
8	The association between Helicobacter pylori infection and inflammatory bowel disease based on meta-analysis	T Rokkas	United European Gastroenterology Journal	22	52	2015
9	Helicobacter pylori infection and inflammatory bowel disease: is there a link?	Konstantinos Papamichael	World Journal Of Gastroenterology	22	41	2014
10	Seroprevalence of Helicobacter pylori infection in inflammatory bowel disease: is Helicobacter pylori infection a protective factor?	P O Väre	Scandinavian Journal of Gastroenterology	21	29	2001

H. pylori on IBD and propose constructive suggestions for existing H. pylori management strategies and IBD treatment strategies, we further analyzed the research results. Keyword analysis shows that the research we have retrieved mainly focuses on case–control studies and clinical trials. Therefore, we delved into the relevant literature and found that the protective effect of H. pylori on IBD was initially discovered through epidemiological studies.[28] However, the exact mechanisms involved remain unclear. Although some scholars have attempted to study the mechanisms involved, these studies have primarily been validated in mouse models,[8] and specific targets have not been identified. The protective effect of H. pylori on IBD may not be focused on a single pathway. Currently, IBD remains a disease with an unclear etiology and mechanism. If we can thoroughly verify the protective mechanism of H. pylori on IBD, it may offer new insights into the treatment strategies of IBD. In the latest authoritative consensus, H. pylori infection has been officially confirmed as an infectious disease that warrants treatment regardless of the presence of symptoms.[29] Moreover, the keyword analysis results also indicate that in recent years, with improvement in health awareness, the public's understanding of H. pylori has gradually deepened. So, should IBD patients infected with H. pylori be cured? Based on previous clinical experience, due to the strong association between H. pylori and gastric cancer, we have actively implemented screening for H. pylori infection. Upon detecting the infection, we promptly initiate eradication treatment. Thanks to these efforts, the incidence of gastric cancer has indeed been declining year by year. However, eradicating H. pylori may have potential drawbacks.

A multicenter, retrospective cohort study found that curative treatment for H. pylori does not alter the short-term disease activity of IBD.[30] However, the control group in this study, which did not undergo H. pylori eradication, did not consider whether the patients were infected with H. pylori. At the same time, the study focused on the short-term effects of H. pylori eradication treatment but did not pay attention to the long-term effects of successfully eradicating IBD patients. In addition, a case–control study also proposed that H. pylori eradication therapy was not associated with the onset of IBD. However, they also suggested that it cannot be ruled out whether H. pylori eradication therapy may lead to latent IBD in specific patient subgroups.[31] Therefore, what kind of relationship exists between H. pylori and IBD, as well as what plays a role in it, needs further research to explore.

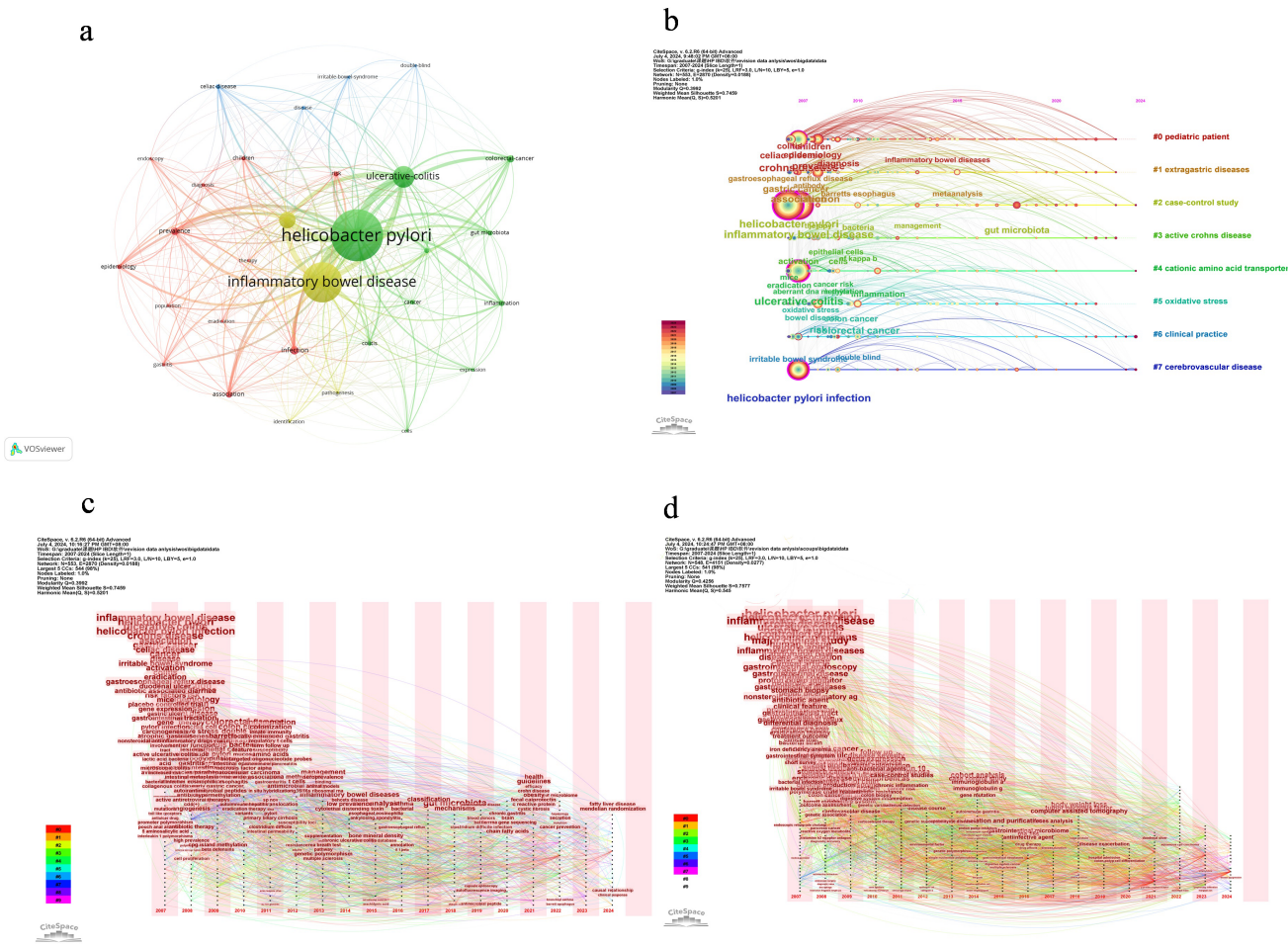

Figure 6 (a) Keyword co-occurrence analysis in WoSCC; (b) Timeline of keywords in WoSCC. (c) Time zone of keywords in WoSCC. Eight clusters are shown in B, and each is labeled with the tag number. The smaller the number, the more keywords are included in the cluster. Each node represents a keyword, and the time when the node appears indicates the time when the keyword emerged. The line between nodes indicates the relationship between keywords and the continuity in time. (d) Time zone of keywords in Scopus.

Most studies focus on the immune mechanism of H. Pylori negatively correlated with IBD, and there are still a lot of gaps for researchers to fill. The results of the keywords analysis suggest that the current research focus is on IBD such as CD and UC. Many scholars are committed to studying the causes and mechanisms of the negative correlation between H. pylori and IBD, because this may have a great impact on the current management and treatment strategies of H. pylori and the diagnosis and treatment plan of IBD. As early as 2011, *Luther J* et al. induced type I IFN and IL-12 responses by DNA-pulsed murine bone marrow-derived dendritic cells (BMDC) and human plasmacytoid dendritic cells (pDC) was analyzed by cytokine production. *E. coli* DNA and *H. pylori* DNA were administered in dextran sulfate sodium (DSS) colitis models to assess colonic severity. It was found that administration of *H. pylori DNA* before induction of DSS colitis significantly improved the severity of colitis compared with *E. coli* DNA or the solute control.[32] In 2015, researchers proposed to conclude from mouse experiments. They found that exposure to H. pylori triggered the transcriptional activation of the mucin 2 gene, leading to the accumulation of a large amount of colonic mucus. And it was found that the NLRP3 inflammasome and interleukin-18 signaling were crucial for this protection.[33] In addition, *Adam Tepler* et al., based on a meta-analysis, found evidence of a significant association between CagA seropositive H. pylori exposure and a reduced chance of IBD, especially Crohn's disease (CD), but not with CagA seronegative H. pylori exposure. More research is needed to confirm these findings and identify the underlying mechanisms.[34] Therefore, other autoimmune-related diseases, such as autoimmune pancreatitis or immune-related fields, as well as innate immunity, are receiving increasing attention. At the same time, it can be seen from the burst words that in the future, more and more keywords related to IBD pathogenesis, such as chain fatty acids and inflammation, will be included in the research scope. In addition, some scholars believe that the negative correlation between H. pylori and IBD is related to the alteration in the microbiota and drug action. They hold that changes in intestinal microbiota induced by

H. pylori infection have the potential to protect against IBD,[35] and the low prevalence of H. pylori seropositivity in IBD is related to current or previous exposure to Sulfasalazine.[28] Similarly, according to a survey, it has been found that the infection rate of H. pylori in patients with IBD is significantly lower compared with the control group.[36] Therefore, in terms of research prospects, there is still room for growth. The research on the correlation between H. pylori and IBD has not yet fully realized its potential and needs further exploration. Such an exploration could include investigating various aspects such as whether there are still underlying mechanisms, genetic factors, environmental influences, and specific treatment options. By delving into these areas, we can accelerate progress and pave the way for breakthroughs in the field. Because the current management strategies for H. pylori infection are relatively proactive in radical treatment,[37] and if the root cause can be elucidated, it will have a significant impact on the current treatment strategies for H. pylori infection. Clinical doctors need to consider more carefully whether every H. pylori-infected patient needs radical treatment. At the same time, this is of great help in understanding some of the currently unclear pathogenesis of IBD, and perhaps finding potential treatment options.

Possible future directions for research on the correlation of H. Pylori and IBD. Based on the keywords related to pathways like NF-κB revealed in the keyword analysis results, future researchers could delve into how H. pylori might alleviate the pathological processes of IBD. This could be achieved by regulating specific inflammatory pathways such as the NF-κB signaling pathway, influencing intestinal mucosal barrier function, or modulating immune responses like the balance of T cell subsets. Alternatively, high-throughput sequencing technology could be employed to analyze the relationship between H. pylori infection and the structure and function of gut microbiota. This exploration could investigate whether H. pylori infection correlates with changes in the microbiome of IBD and examine how these changes impact the development of the disease.

Furthermore, while there are substantial epidemiological data, current analysis indicates a scarcity of long-term follow-up cohort studies. Initiating such long-term prospective cohort studies could help track the long-term effects of H. pylori infection on IBD patients' prognosis, including disease progression, surgical rates, and quality of life. Additionally, there is potential to evaluate the clinical application of using H. pylori or its components to treat or prevent IBD. This assessment might encompass studying the relationship between H. pylori infection and the incidence of IBD, as well as assessing the effects of H. pylori treatment on the progression of IBD in patients.

Most importantly, within the current landscape of H. pylori eradication strategies, it is crucial to consider whether H. pylori infection status could be integrated into personalized treatment strategies to optimize treatment plans for IBD patients. This approach would involve tailoring individualized treatment strategies to each patient rather than applying a one-size-fits-all approach to H. pylori eradication. It is important to note that besides the abstract, author keywords, and field, other features of WoSCC can influence bibliometric analysis results.[38] Therefore, we included Scopus database analysis as an additional check to strengthen the conclusion's reliability. Due to time constraints in gathering literature, we focused solely on English publications. To maintain accuracy, review articles were excluded during literature screening. However, this approach may result in incomplete data collection, potentially biasing the analysis results.

Conclusion

This study indicates that from 2007 to 2024, research on H. pylori and IBD has become increasingly popular, and the scope of research has gradually expanded, proving that this research field has good prospects, especially because most of the current research on the two is epidemiological investigation or meta-analysis. There is no enough strong evidence available on why H. pylori has a protective effect on IBD; this is also a direction that can be further studied, and this will have a significant impact on the prevention strategies for both diseases.

Data availability statement. Original contributions presented in the study are included in the article, and further inquiries can be directed to the corresponding author.

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